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NEWSPAPER

U.S. vs. IBM

Justice Releases Trial Issues

By Edith Holmes
Of the CW Staff

NEW YORK – The U.S. Department of Justice has submitted its statement of the antitrust issues to the U.S. District Court here, finally making public the grounds on which the government intends to bring IBM to trial.

Issued late last month, the statement has received considerable criticism, and a counter statement of issues from IBM's counsel claims "the effect of the government's action is to frustrate the expeditious and efficient preparation of the case for trial."

Divided into nine sections, the 19-page government statement covers triable issues under such headings as market definition, market measurement, market structure, intent to monopolize, bundling, "fighting" machines, educational allowances, peripherals and leasing.

Market Definition

The Justice Department said it expects the trial to begin with some determination of the market under discussion. For example, the court must decide whether the U.S. constitutes an appropriate geographic area for measuring IBM's market position and whether "general-purpose electronic digital computer systems" constitute a definable, separate market in which to gauge the degree of IBM's monopoly in any part of trade or commerce.

The statement suggested that the court exclude from its market definition general systems manufactured for scientific, telecommunications and sensor-based applications; equipment manufactured for special purposes like military weapon systems and severe environmental conditions; analog computer equipment; used equipment still being marketed; computer leasing company activities; and the sale of computer-related services.

Justice has also urged the court to con-

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Program Patented As 'Apparatus'

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – In its first software case since the 1972 decision on Benson-Tabbott, the U.S. Court of Customs and Patent Appeals (CCPA) held late last month that a software system is patentable subject matter when claimed as apparatus or part of an overall computer system.

By a 3-2 decision, CCPA reversed the finding of the Patent Office Board of Appeals which held that an automatic financial recordkeeping system that employs a digital computer could not be patented.

The specific system under question, invented by Thomas R. Johnston of Iowa, uses the magnetic ink characters imprinted on checks as input to maintain an individual's personal and business financial records in a bank. Extra characters are imprinted on the checks and on deposit slips that channel the transactions to the proper computerized ledger accounts as defined by the individual.

The bank can periodically print a summary financial status for the individual and in a sense automatically maintain the individual's "books."

The majority opinion, written by Judge Phillip B. Baldwin, found "recordkeeping machine systems are clearly within the 'technological arts.' Such machine systems, which comprise programmed digital computers, are statutory subject matter."

He cited an earlier case in which the phrase "technological arts" was ruled to be synonomous with the phrase "useful arts," as used in the U.S. Constitution. From still another case, he added the finding that "claims defining [technological arts] must be judged for patentability in the light of the prior art.

Benson 'Not Applicable'

Baldwin rejected the Patent Office's claim that the Benson-Tabbott ruling against patents is "logically applicable to the instant apparatus case." He said the current claim, in apparatus form, "does not claim or encompass a law of nature, a mathematical formula or an algorithm . . . We do not find the holdings of Benson to be applicable."

The Benson-Tabbott patent was overturned because it basically was an algorithm – a machine-independent program to convert binary coded decimal numbers to true binary. Since then, however, programs such as Applied Data Research's Autoflow have been patented.

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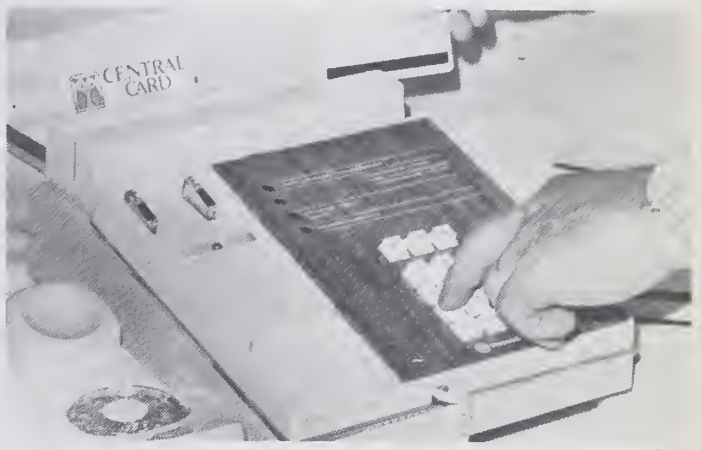


CW Photo by Ronald A. Frank

AT&T's 'Transaction Telephone' reads and transmits data from magnetic stripe cards.

AT&T Terminal Sends Magnetic Stripe Data

By Ronald A. Frank
Of the CW Staff

LOS ANGELES – AT&T has introduced a credit authorization terminal that can read, store and transmit data from magnetic stripe-coded plastic cards.

Although the device performs all the typical functions of a credit terminal, Bell calls it a Transaction Telephone and expects to first tariff the unit in the early part of 1975.

Data is read into the phone terminal by sliding a plastic credit card from right to left through a slot reader. The reader is "almost impervious to speed" and can detect any information recorded on Track 2 magnetic stripes as defined by the American Bankers Association, an AT&T spokesman said.

In a typical operation, a retailer passes his "merchant card" through the slot reader to dial up the desired charge plan computer and identify his store location.

The customer's plastic charge card or bank card is next passed through the slot reader and the amount of the purchase is entered on the data entry key pad. This information is stored in a buffer within the terminal and transmitted in a block to the CPU.

At this point the retailer will receive either an approved or nonapproved credit indication from the CPU through a light on the terminal. Or he can use the attached Trimline phone to get an answer from an audio response system or to discuss the account with an operator at the credit center.

(Continued on Page 5)

Data General 'Eclipses' Nova Family

By Patrick Ward
Of the CW Staff

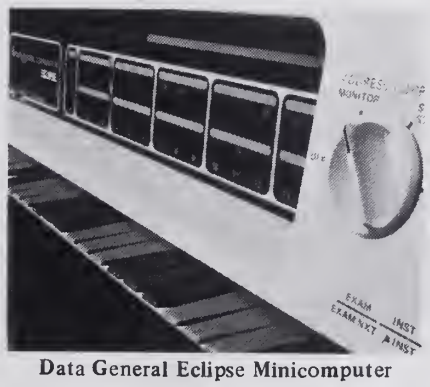
NEW YORK – Data General has "Eclipsed" the top of its Nova line with what it says are two less expensive but more powerful minicomputers.

The two members of the Eclipse Series announced here last week, the S/100 and the S/200, offer an expanded microprogrammable instruction set, better error control, interleaving and cache memory to increase throughput in a system that costs less than the Nova 840, according to Data General.

The Eclipse S/200 system comes with a maximum 256K bytes of core or semiconductor memory. The S/100 comes with up to 64K bytes.

The Eclipses have the Nova 16-bit instruction set for compatibility, plus additional 16-bit and 32-bit instructions to replace software routines used on Nova minicomputers. All Eclipse interrupt handling routines, for example, are in the hardware, a spokesman noted.

The minis also have an error checking and correction (ERCC) capability said to detect and correct all single-bit main memory errors, as well as detect most multiple-bit errors.



Data General Eclipse Minicomputer

Data General credits interleaving with helping the core-based Eclipse process a benchmark program 45% faster than an 840.

A cache of faster bipolar memory in front of semiconductor memory modules also improves Eclipse throughput beyond Nova levels, the firm stated.

The S/200 also offers a floating point processor much faster than that on the Novas, Data General added. This option is not available on the S/100.

The Eclipses' microcoded instruction set offers hardware stack operations to save time and overhead, and a vector instruction identifies an interrupting device and transfers control to the device handler in about 2.7 nsec.

There are also instructions not available on Novas for block, word, byte and bit manipulation; fixed point signed and unsigned multiply/divide arithmetic; immediate and extended addressing; and decimal arithmetic.

An XOP instruction gives the user access to 256 words (56-bit word) of random-access memory. The feature allows the user to microcode specialized instructions, repetitive routines or an instruction set and access them with a single instruction, Data General stated.

Eclipse offers Extended Fortran 5 and Real-Time Fortran IV. The new computer also supports both Extended Basic and Extended Algol and offers an IBM 2780 emulator.

ERCC is one memory system feature that Data General hopes will prove attractive to data communications and process control users.

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DEC's KL-10 Claims 168 Communications Ability

By a CW Staff Writer

MARLBORO, Mass. – Users will be able to get a system with capabilities beyond those of the IBM 370/168 in communications applications and almost equal to the 370/155 in commercial batch applications if Digital Equipment Corp.'s (DEC) expectations for its new KL-10 processor are realized.

The KL-10, scheduled for introduction this week, employs Emitter Coupled Logic (ECL) in the processor and incorporates a new microcoded Business Instruction Set (BIS) for commercial applications. The unit is also capable of virtual operation, but this is not being emphasized by DEC at this time.

The system had been scheduled for announcement six months ago, and several present Decsystem-10 users have been briefed on the new system.

The KL-10 processor, which is the heart of the new DEC systems 1080 and 1090, also features a 2K ECL cache memory that provides average memory access time of "somewhat less" than 250 nsec, or three to five times the speed of older core memory, according to the DEC specifications.

In addition, the processor provides four memory ports permitting four words to be read or written at the same time. A PDP-11/40 minicomputer is built into the system to act as a front end, to run system diagnostics and to serve as the console for the system through two CRT terminals.

This mini is interfaced with the logic of the mainframe through logic modules referred to as Data Ten to Eleven (DTE).

Furthermore, the system uses a new disk, RP04, which is comparable to IBM's 100M-byte per spindle 3330 and is supplied to DEC from Univac's ISS division.

A new tape drive is also offered – the TU56 – with a capability of 1,600 bit/in. at 200 in./sec. This unit is supplied to DEC from Storage Technology Corp.

In addition to the ECL cache memory, the unit can have up to 4M words of core memory, even though the maximum addressable limit of a user program remains at 256K under the DEC Operating System.

The MG10 memories manufactured by DEC have 32K, 64K and 128K stack sizes and feature two- and four-way interleaving, in addition to eight ports – twice the number of the older Decsystem-10s.

Any two ports on the memory can be active at the same time, DEC said.

New features of BIS in microcode include double add, double subtract, double multiply and double divide, which give Cobol the capability of operating on variables up to 20 digits.

Another BIS instruction is the String instruction which performs nine functions: Edit, Move String Offset, Compare Offset, Compare Translated, Decimal To Binary Offset, Decimal To Binary Translated, Binary To Decimal Offset And Binary To Decimal Translated.

The translation function through table lookups allows such translations and conversions as Ebcdic to Ascii.

Communications through the DTE is composed of bit transfers which are capable of handling strings since the PDP-11 bytes are eight bits while the Decsystem-10 bytes are of arbitrary lengths.

Another function of the DTE is Examine And Deposit which is a program function driven by the minicomputer.

The additional function of the DTE is diagnostics. There is a seven-bit diagnostic bus which comes from the DTE and travels throughout the machine.

It is used to transmit diagnostic commands and to examine the control logic of the CPU.

This function is said to be able to read out the status of the machine, independent of normal operations.

The system will also add a new DEC data communications message protocol to the bisynchronous system operating over duplex lines, and each of the new processors can handle a maximum of 512 terminals, DEC said.

Prices will be released at the press conference scheduled for this week.

K.C. Agencies Told to Ante Up for Justice Network

By Nancy French
Of the CW Staff

KANSAS CITY, Mo. – Law enforcement agencies in the Greater Kansas City area may be forced to drop out of the criminal justice computer system here unless they can come up with the funds to pay for their share.

The pay-as-you-go-move, announced in a letter sent to 56 agencies that currently participate in the Kansas City Police Department system, is scheduled to take effect Jan. 1.

Since the system went into operation in 1968, the police department encouraged criminal justice agencies in the five-county area to hook into the system without charge. But a problem arose when the Missouri Council on Criminal Justice (MCCJ) learned its federal funding from the Law Enforcement Assistance Administration (LEAA) would be cut for the coming fiscal year.

Faced with many competing priorities, MCCJ was forced to cut spending on existing programs. And reduced funding was compounded by poor timing – the LEAA announcement came several months after final municipal budgets for fiscal 1975 had been approved.

The system has been generating uniform crime reports and other statistical data, while at the same time allowing local agencies to tie in with the FBI's National Crime Information Center.

One such agency is in Overland Park, a municipality in the Kansas City Metropolitan area. It has been assessed $49,000, according to a letter received by Chief Myron Scafe. "Overland Park's use of the system was estimated at 3%," Scafe related, "and 3% of the $1.6 million budget is $49,000.

"We just don't have that kind of money," he said.

Fifteen police agencies in the state of Kansas – a few miles away – currently hooked into the system may have an even more difficult time coming up with funds, since that state has never initiated a state plan for data processing and, therefore, gets no federal funding.

A meeting has been scheduled this week in an effort to iron out at least procedural problems and establish a timetable for payments.

Honeywell Ups Prices 2% to 10%

WALTHAM, Mass. – Honeywell has increased rental prices on most of its computer products and services between 2% and 10%, depending on the equipment and the contract terms.

Purchase prices on selected equipment were also increased.

The company attributed the increased prices to "rising costs caused by inflation and high interest rates."

The new prices were effective Oct. 1 except in cases where contractual arrangements required 90 days notification. The company said some long-term rental contracts have price escalator clauses limiting increases to 2% per calendar year.

Typical increases by Honeywell were: Series 200 and 2000 central processors and peripherals, 4%; Series 6000 central processors, up to 9% depending on contract terms; and Series 400, 600 and G-200 central processors, 5% to 10% depending on contract terms.

The company also said rental prices for its Series 60 computers were increased from 6% to 8%. Purchase prices for the 66 and 68 levels were increased 8%, and on Jan. 1 purchase prices for Series 6000 and Multics will be increased by 8%.

Maintenance charges were increased from 5% to 9% depending on equipment involved, and the company's Datanetwork time-sharing services increased an average of 10% depending on contract and service requirements.

Systems engineering services were increased 8%.

In addition, the company noted that effective Jan. 1 it would implement separate pricing in the areas of education training and selective systems engineering services.

Calcomp Follows Suit

ANAHEIM, Calif. – California Computer Products, Inc. has announced an 8% increase in lease prices, a 10% increase in purchase prices and an 8% increase in maintenance rates for end-user disk and tape memory products, effective immediately on all new orders.

There is no price increase on Calcomp's computer graphics products at this time, a spokesman said.

Strike Against Automation Vowed

KANSAS CITY, Mo. – A candidate for president of the National Association of Letter Carriers said here recently that, if elected, he would call a nationwide strike of letter carriers before he would allow the U.S. Postal Service to implement route setting by computer.

The candidate, Vincent R. Sombrotto, president of New York Branch No. 36 of the association, has cast his hopes against James H. Rademacher, the incumbent.

At issue is a plan the Postal Service said could equalize the work load among carriers while increasing productivity. The project would utilize such input as mail volume, street measurements, the number and type of mail receptacles, vehicle travel and foot travel.

Sombrotto sees the measure as just one more way to increase the letter carriers' work load without a corresponding improvement in services or benefits for them.

"Letter carriers already are so overworked that they have become more subject to nervous disorders," Sombrotto claimed. He cited a 1973 study of letter carriers in the northwest region which indicated they now have three times more heart attacks than ever before.

Russell Wyly, a spokesman for the Postal Service in Washington, called the study "a lie. There's no data to substantiate that claim.

"Right now we're increasing productivity by use of vehicles, cluster mail boxes and better structured routes," he said, "not by trying to make letter carriers walk faster."

The Oct. 10 union election is providing letter carriers' spokesmen ample opportunity to vent their fears of automation. A tally of votes is expected by the end of October.

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Next they have to determine all the data structures, and find every data and statement label reference affected by the enhancement.

Last — though hardly least — they have to build a set of test data and repeat the verification procedure.

Even a simple Enhancement — adding a new reporting function to an accounting program, for example — should go through a cycle like that.

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In a group of programs, AUTOFLOW II's Cross-Program Auditor (CPA) isolates references to data fields across program boundaries, so that the impact of any change on the total system is instantly known.

Some Enhancements boil down to standardizing the source code to improve maintainability, optimizing to enhance program throughput, or modifying *en masse* often-used program logic to add new management information. MetaCOBOL is ready to help. For example, to add input/output record accounting logic in all COBOL programs, thousands of lines of code must be added to hundreds of programs. Using the MetaCOBOL Translator, define a few rules, translate all programs, and the job is finished.

The Translator comes with a comprehensive, flexible set of macros for a variety of standard applications, such as calls to IBM's IMS. But the beauty of the system is the fact that you can create your own macros to meet unique situations — and to enforce local programming standards.

The MetaCOBOL Test Data Generator (TDG) responds to a set of functional directives embedded in the source code to generate ideal test data, exercising every path of a program. A companion module, the Run-Time Debugging Aid (RDA), reports on the internal status of the system and the intermediate values of variables in any desired degree of detail. It too responds to embedded directives.

Still more help is available. The System Analysis Machine (SAM) produces an accurate forecast of the impact of the Enhancement on system throughput. You describe your IBM hardware and system software with a few macro calls, and let SAM's Automatic Model Generator use the output of a hardware monitor or IBM's SMF to model your existing workload automatically. This synthetic job stream model is augmented by a SAM representation of the Enhancement — and the total system is run and reported on.

During Enhancement, protect the integrity of the existing application with the access-control and auditing facilities of The LIBRARIAN. It keeps a history of all changes to a program and provides full administrative control of such changes. The LIBRARIAN lets you make trial changes to source code without affecting production versions of the program.

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Wants Market Limited

Justice Releases the Issues in IBM Antitrust Case

(Continued from Page 1)

sider whether various sizes of general-purpose computers and the manufacture and marketing of such peripheral devices as tape drives, disk drives and add-on memories should be included as submarkets under general-purpose computer systems.

To Monopolize or Not . . . ?

Under the category of market measurement, the court must determine whether IBM's pre- and post-suit records may be used to establish an attempt to or success in monopolizing any one market or submarket, according to the statement. The document then asked the court to decide whether changes in policy following the Justice Department's announcement of the suit indicate IBM's awareness of a monopoly position.

Another issue to be settled by the court is whether Justice's evidence of IBM's intent to monopolize, and statistics collected by experts in computer industry measurement, will be admitted into the record.

Finally, the department asked if sales value, unit volume, lease value and annual revenues involved in the sale and lease of systems and peripheral equipment would be permitted as market measures in the courtroom.

The statement of issues outlined certain market structure indicators for the court to consider as evidence of Section 2 violations of the Sherman Antitrust Act.

Among the issues the Justice Department expects to be resolved are whether the sustained high level of profitability by IBM in comparison with its competitors during a growth period in the general systems and peripherals markets, the absence of significant entry by new firms plus the exit of two major companies during that same period and IBM's market share throughout indicate that these markets are monopolized.

The statement also said the department would like the court to establish whether substantial barriers exist to prevent the entry and expansion of IBM competitors.

In addition, the court will have to decide if IBM has the ability to price its products substantially higher than the comparable products of its competitors, if the firm has the capacity to establish product standards unilaterally and whether either of these factors indicates monopoly control in the marketplace, the statement said.

Effects of Bundling

The Justice Department also hopes to establish the purpose and effect of IBM's bundling practices, both before and after the announcement of the government suit. Some of the questions the court will have to wrestle with are:

- Did IBM use bundling as a barrier to entry and expansion of its competitors in the marketplace?
- In particular, did the company use bundling to restrain or attempt to restrain the emergence or growth of independent software and computer equipment maintenance companies?
- Did bundling enable IBM to maintain or increase its market share, to exercise "account control" in sale or lease of products to customers, to "lock in" computer product customers by offering free software products and software services and to price discriminate among customers by varying the amount of customer support services offered or supplied?
- Did the company use bundling after June 1969 to hamper competitors in software, peripheral equipment manufacture and computer performance measurement?
- Did IBM misrepresent characteristics, delivery dates, capabilities and/or specifications of computer performance measurement software and related hardware?
- Does IBM continue to engage in these practices to prevent, inhibit and interfere with independent, unbiased or impartial measurement of performance of IBM computer products and services?
- Did IBM offer systems engineering support to customers at no charge from June 1969 to date, and has this support permitted the company to price discriminate among its customers and to restrain emergence or growth of competitors?

'Fighting Machines'

The Justice Department statement of issues also requests that the court determine whether IBM "announced and/or introduced the Systems 360/44, 360/67, including models 64 and 66, 360/90 series, and the 2319A and 2319B disk drives" with the knowledge that these products "had unusually low profit expectations."

The department hopes to establish whether IBM's use of these "fighting machines" was intended to blunt its competitors' edge in these markets.

The court will also have to decide "whether IBM announced the future production and marketing" of the 360/44, 360/67 and 360/90 series, realizing these products could not be placed on the market within the announced time frame; whether the company advanced the announcement dates for the entire 360 line either before these products had been fully tested or announced in conformance with IBM established procedures on product announcement and marketing; and whether IBM misrepresented to customers the characteristics, delivery dates, capabilities and specifications of the 360/44, 360/67, and 360/90 Series and the 2319A and 2319B disk drives, all in an effort to maintain a monopoly position.

The statement said the Justice Department also expects the trial to determine whether IBM, in marketing or attempting to market its products to educational and scientific institutions, has granted discriminatory discounts or allowances, granted full or partial gratis machines or other gratis products, or rental credits for machines or products, negotiated or executed "value received" contracts, purchased back computer time or granted large monetary amounts to these institutions.

Listing a number of schools where the Justice Department suspects these practices may have taken place, the document questioned whether the purpose and effect of these practices was to maintain or increase IBM's market share, to insure familiarity with IBM products among persons trained on computers, to lock in IBM computer systems in prestige educational and scientific institutions, to prevent or discourage actual or potential competitors from obtaining or maintaining the installation of computer systems in these institutions or to inhibit the market growth of competitors.

In the area of peripherals, the government hopes to uncover whether IBM's 2319A and 2319B disk drives were essentially revised groupings of 2314 subsystem disk drives offered at prices substantially less than other 2314 subsystem disk drives.

The statement of issues also indicated the Justice Department wants to find out if IBM's Integrated File Adapter had the effect of downgrading the performance of certain CPUs to which it was attached without providing sufficient benefits to offset the degradation, and if the company's Integrated Storage Controller was a standard channel controller mounted in the CPU box.

In addition, the government would like to know whether IBM's 3420 Series of magnetic tape drives was basically the 2420 Series of tape drives offered at prices substantially less than the 2420 Series.

The statement asked the court to determine whether IBM had used a number of tactics, including the extended and fixed term plans, to restrain or attempt to restrain competitor entry, existence or expansion in the peripheral markets.

Whether the firm engaged in specific practices designed to encourage customers to lease products from IBM constitutes the final category of issues included the Justice Department statement.

Did IBM manipulate the relationship between lease and purchase prices to encourage the lease and discourage the purchase of its equipment? Did the company announce and offer extended and long-term product leases at substantial discounts with substantial penalties for premature termination?

And finally, did IBM employ salesmen compensation policies designed to encourage salesmen to attempt to lease rather than to sell computer equipment?

The statement of issues said answers to these questions must predicate the court's understanding of whether IBM created a lease-oriented environment, thus raising capital barriers which limited the entry or expansion of competitors in the general systems and peripherals markets.

IBM 'Refutes' U.S. Statement

NEW YORK – In response to the statement of issues released by the Justice Department, IBM has filed a counterstatemcnt outlining what it considers to be "the substantial issues" in the antitrust case.

Submitted to the U.S. District Court here, the IBM statement argued the Justice Department abandoned efforts to negotiate a joint statement and issued instead a document "so partisan and incomplete that it could never serve as an agreed statement."

IBM counsel charged the government failed to mention issues "basic to a Section 2 action."

For example, IBM lawyers noted, Justice didn't include as a separate issue "the importance of growth and technological change . . . Apparently, the department is fearful that the unprecedentcd technological and price/performance improvements offered to customers in an industry whose growth has also been unprecedented is not consistent with the charge that this business is stultified by the dead hand of monopoly."

Counsel for the corporation also noted the government omitted "any issue relating to whether IBM's skill, foresight and industry" has substantially caused "whatever success IBM has attained."

IBM's lawyers contended the Justice Department's statement of issues abused the function of such a statement by discussing "evidentiary matters" in addition to presenting the framework of issues on which thc trial must proceed.

"How the parties involved intend to fill in that framework has no part in a statement," they said.

Finally, IBM asserted the government statement added several new issues to the case, among them IBM's markct share in three peripherals markets, IBM bundling practices, the company's use of the 2319A and 2319B disk drives as "fighting machines," and IBM's conduct in the areas of peripherals and leasing.

IBM's "revision" of the Justice Department's statement of issues accordingly omits what it considers to be the additional issues, eliminates evidentiary statements and places all remaining issues in question form.

Court Rules Software Patentable as 'Apparatus'

(Continued from Page 1)

The CCPA decision was immediately hailed by Morton C. Jacobs, Johnston's lawyer, calling it "a giant step toward insuring protection for innovators in the software industry . . . The decision deals squarely with the issue of patents for computer programs and [with] interpreting the scope of the Supreme Court's decision [in Benson-Tabbott]."

The CCPA decision can be appealed, either through a request for a rehearing at CCPA, or a request to the Supreme Court for review. Requests for such action can come from the Patent Office or from the Justice Department.

Patent Office solicitor Joseph Nakamura declined to comment on what he might do. He noted he had 20 days to seek a CCPA rehearing and 90 days from the date of decision to seek Supreme Court review.

Patent Commissioner C. Marshall Dann said his office is studying the decision. "We are giving some thought to whether we should now change our practices," he added, "or possibly seek reconsideration or review by the Supreme Court."

Split Apparent

Although he has not made even a tentative decison on which way to go, he noted "obviously CCPA had a division as to what the Supreme Court told them in Benson-Tabbott. This was, after all, a 3-2 decision."

Separate dissenting opinions on Johnston's appeal were written by CCPA Chief Judge Harold T. Markey and Judge Giles S. Rich. Rich's opinion is of special interest to lawyers since he was the author of the original pro-patent CCPA decision on Benson-Tabbott which was overturned by the high court.

The language of his dissent in this case indicates to some observers that he considers Johnston's invention to be patentable, but that he wants the burden of that ruling to be on the Supreme Court.

Still hurt by the high court's 1972 decision, he waxed philosophical in his current dissent: "I find it significant to contemplate the identities of the troops lined up for battle in Benson, and observe which side obtained the victory.

"On one side was the government, against patenting programs or software, supported by the collective forces of major hardware (i.e., computer) manufacturers and their representative associations who, for economic reasons, did not want patents granted on programs on their machines. On the other side was Benson et al and their assignee and assorted lawyers and legal groups who were in favor of patent protection for programs or software.

"The antipatenting forces won the victory – if not an altogether clear one," Rich's opinion stated.

Jacobs had a part in the Benson-Tabbott decision, having filed amicus curaei briefs with the Supreme Court on behalf of the Association of Data Processing Service Organizations (Adapso) and Applied Data Research Corp., a software house.

'Transaction Telephone'

AT&T Terminal Reads, Transmits Magnetic Stripe Data

(Continued from Page 1)

The storage capacity of the buffer has not yet been set, a spokesman said, but it will definitely be more than 100 characters and could be as much as 160 characters. The terminal also has a repertory dialer which can be loaded from a magnetic stripe card for often-used numbers, the spokesman added.

First tariffs for the Transaction Telephone are planned for April 1975 and will range from $20/mo to $25/mo with an estimated $50 installation charge. Customers may be expected to sign up for a two-year period and have to pay a "termination liability charge" for early cancellation, the spokesman said.

Shown After Tests

AT&T demonstrated the terminal at the annual credit management conference of the National Retail Merchants Association, held here last week.

The device is an outgrowth of a test by Bank Systems, Inc. in Akron and other Ohio locations. The test was held between November 1973 and February 1974 and included 33 terminals installed at 13 retail locations.

The first full-scale test of the current version will begin early this month at a bank in Cincinnati. The Central Trust Co. will install the Transaction Telephone at 31 branches under a special assembly arrangement of $25/mo. The terminal will be installed in branch bank lobbies so customers can access account information.

Unlike other credit authorization terminals which operate on private lines, the new Bell unit is a dial-up device. It is primarily designed for the small merchant who typically accepts credit purchases from several customer charge plans, the spokesmen explained.

Instead of the standard Bell Touch-Tone 12-key pad, the Transaction Telephone includes two different control characters in the bottom row. A "slash" in the lower right is used to separate fields and a "dot" in the lower left is used for a decimal point.

Three additional control characters include an "erase" key to stop a transaction, an "end" data key and an "attention" key to signal an operator at a credit center.

The terminal includes an LSI microprocessor, a memory and a buffer. In the present version, the credit device includes a non-Western Electric CPU on a chip. Future models may include a LED display for "hands-off" operation.

The current model has a dial capability in the Touch-Tone pad which operates on user-supplied ac power and in the phone handset which runs on phone company dc.

Data General 'Eclipses' Novas

(Continued from Page 1)

Available on both core and MOS memories, ERCC adds a five-bit check field to each 16-bit memory word. This check field is examined when data is written into memory and again when it is read from memory.

If a bit is in error, ERCC can correct the bit by complementing it. Single-bit error correction takes between 200 nsec and 800 nsec, depending on memory type. ERCC's word checking does not affect the Eclipse computers' cycle time, Data General said.

ERCC would permit users with critical real-time applications to continue operating even if a memory module was not functioning properly, the company noted. ERCC can be instructed to log errors and can be set to isolate them to a single module, word and bit to aid in troubleshooting.

Also adding to the Eclipses' speed and throughput levels, Data General said, are interleaved memories (up to eight ways for core, four ways for MOS). This means the computer can store sequential data on different memory modules, which results in greater throughput since the Eclipse computers can access several memory modules concurrently.

The Eclipse computers have an asynchronous memory bus and can be ordered with 16K modules of either core or MOS semiconductor memory. The MOS memory has a 700 nsec cycle time, but a "cache" with more expensive 200 nsec bipolar memory sits between it and the CPU.

When the central processor requests a memory word, it checks Content Addressable Memory (CAM) to find the addressed word. If the word is in cache, it moves to the CPU in 200 nsec.

If the addressed word is not in cache, CAM requests it from MOS memory, which sends it through cache to the central processor in 700 nsec. At the same time, cache is loaded with four sequential words including the addressed word.

Because programs tend to be sequential, the next location addressed is likely to be one just loaded into cache, from which it can reach the CPU in 200 nsec, Data General explained.

An algorithm automatically updates cache memory by discarding data least likely to be needed again, the firm noted.

The Eclipses' floating point processor operates in parallel with the CPU and can do a double precision floating point add in 2.4 μsec, which is about the same time as an IBM 370/158, Data General said.

Address Compare

Other Eclipse features include memory allocation and protection to provide program and data integrity in multiuser environments, and an address compare facility on the front panel for hardware debugging of programs.

Data General said it plans to offer IBM 3330-type disk drives for use with the Eclipse models and the top of the Nova line.

A 128K S/200 is priced at $32,500 with standard core memory and $44,500 with standard semiconductor memory. The S/100 costs $11,900 with 32K bytes of core or $14,900 with the semiconductor memory.

Deliveries are scheduled to begin in February from the firm in Southboro, Mass. 01772.

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'Purely a Political Problem'

State's Consolidation Effort Snagged by Users' Fears

By Patrick Ward
Of the CW Staff

BATON ROUGE, La. – Although several states appear to have consolidated their DP operations successfully into a central data center, they still have to contend with users who fear the move will cost them control over their DP work.

This was part of the problem in the state of Louisiana, where the revenue department, which had previously done most of its work manually, began automating a much greater part of its workload on a 526K Honeywell 6060 in the state Office of Information Services (OIS).

The revenues department was soon complaining about lack of cooperation, hardware problems, software troubles and the way work was handled, according to Alfred Robinson, director of the OIS office [CW, April 10].

A spokesman for the administration department, in turn, talked of "people who want their own little independent computer kingdom."

News Update

It was "purely a political problem," he said.

The revenue department asked for and got its own IBM 370/145, which was installed last month.

Joseph N. Traigle, commissioner of revenue, explained that he feels it's best for his department to run its own "mini center" and develop its own programs until these application systems are in a "steady state."

Then the department again would be open to the question of centralized equipment because of the possible cost benefits, Traigle said.

Both Traigle and Robinson said they thought the revenue department was using its 370/145 efficiently.

One of the main problems in working with the consolidated center was that "all the programming expertise and the outside consultants were under the control of another agency," Traigle explained.

That meant there was "a problem of them developing a satisfactory understanding of what the revenue department does," he commented.

Although he admitted his people may have been partly to blame for the problems, "one of the really tough things about the situation we were under was that you couldn't really pinpoint where the problem was."

That led to fingerpointing on both sides, he said.

Since the revenue department's whole job is the collection and correlation of data, the DP work "just has to go right," Traigle said in justifying the split.

Emphasis on Planning

DP centralization in Louisiana now focuses more on centralized DP planning than on centralized operation, Robinson commented.

The state may have originally envisioned the latter course, he said, but "the diversity, size and complexity" of the applications in state agencies decided against it.

The revenue, welfare and highway departments, which now have IBM 370/145s, and the public safety department, with a Univac 494, will all have their own computers for the next several years, Robinson predicted.

These computers will communicate between each other as much as the state-of-the-art allows, he said. The role of the OIS will be both to provide for and arrange backup and to pick up parts of the departments' workloads.

Meanwhile, the OIS has launched the Financial Accounting Control System, a uniform financial reporting system in which all state agencies will participate.

The system will rely on standard documentation and input documents, and its goal is to produce more timely, accurate and detailed reports on how the state and individual agencies are spending money, Robinson explained.

N.J. Dispute Festers Over Contract Award

By a CW Staff Writer

JERSEY CITY, N.J. – Jersey City may have violated a state bidding statute by choosing a more expensive IBM system over competing NCR equipment, according to City Councilman Thomas Maresca.

At issue is the city's $13,960/mo contract with IBM for a 370/125. NCR's bid had totalled $13,142/mo.

Unsatisfied with an explanation given by the city's business administrator, Peter A. Korn, that the city acted on the report of an evaluation committee which indicated the IBM system more closely matched the city's needs, Maresca said he wants the matter investigated further, perhaps by the county prosecutor. (That office is now considering the situation.)

Maresca has charged the city's bidding specifications were written with the IBM system in mind. And Nick Donatiello, NCR's district manager, agreed.

"The city has the ability to bid for whatever it wants, but why make a farce out of it?" Donatiello commented.

An IBM spokesman denied any improprieties, adding the city did not commit itself to the lease or purchase of IBM equipment prior to the awarding of the contract.

Previous Dispute

Jersey City had previously been involved in a dispute with NCR over a $26,000 bill for computerizing a water-billing system.

The city declared at that time it would not pay NCR until the water-billing system was operating to its satisfaction. Both sides now report that the matter has been settled.

Maresca agreed that the city had been behind on its water billing, but said he felt that the problem lay more with the city's administration than with the computer system used.

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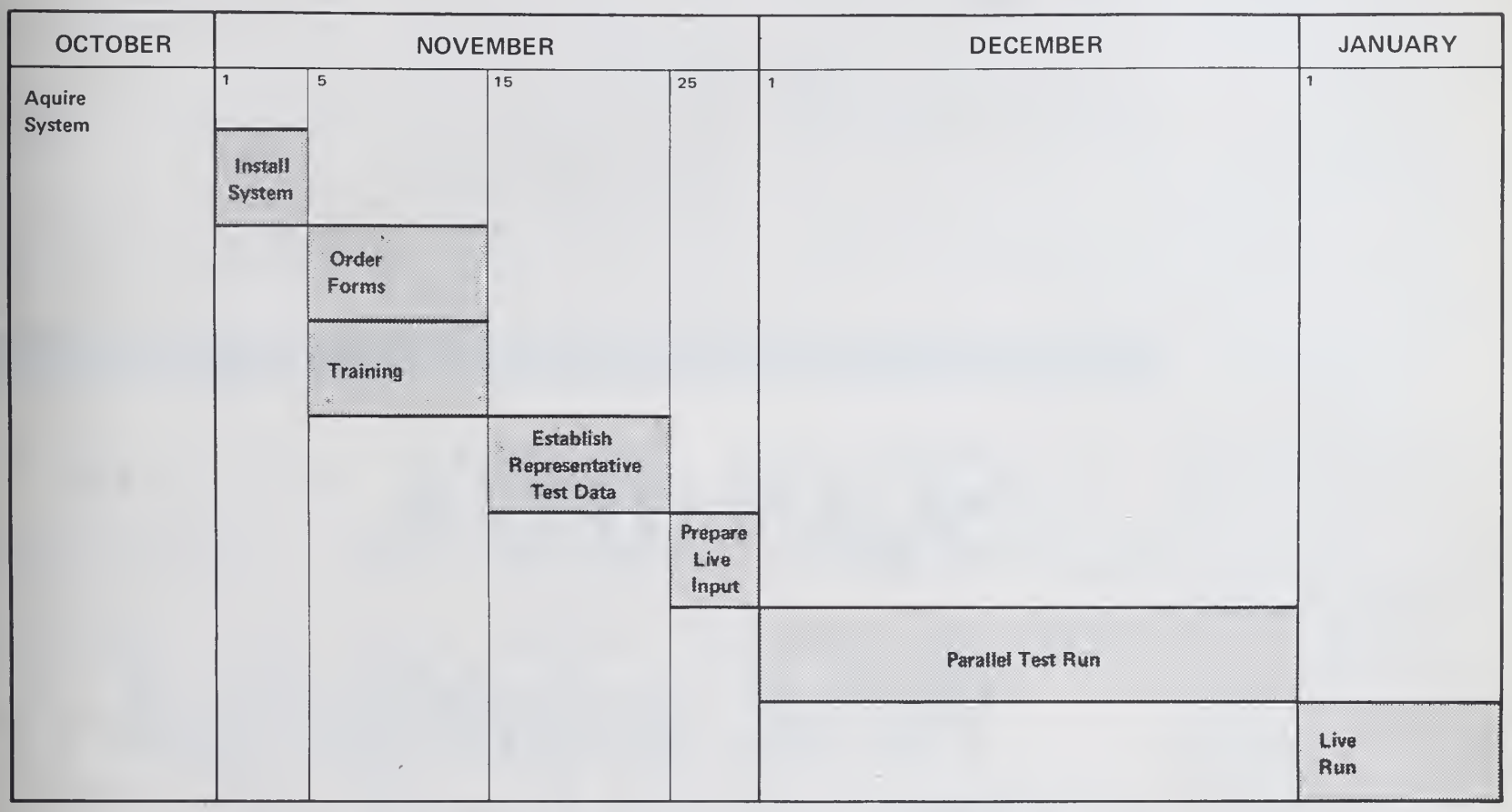

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P

Success in St. Louis

Police Systems Differ in Approach, Sophistication

By Nancy French
Of the CW Staff

NEW YORK – The rising crime rate, coupled with skyrocketing policemen's salaries, has pressed state and local law enforcement agencies into adopting systems that help put policemen where crimes are most likely to happen.

A recent meeting here revealed that enrolling automated recordkeeping and management information systems vary widely in sophistication, approach and effectiveness.

In the St. Louis area, through the Regional Justice Information System (Regis), law enforcement officials now can predict where crimes are most likely to happen and "schedule policemen where the demand is, literally, by the time of day, the season and geographical area," according to Regis general manager Alan A. Hamilton.

This frees surplus police personnel "to patrol areas where suppressable crimes – deterred by obvious police presence – are heaviest," he explained.

Success Not Contagious

But the successes in the St. Louis area are not necessarily mirrored in other areas of the country, conference attendees learned.

Captain Robert C. Dalton, Chief of the New Jersey State Police Fingerprint Records Bureau, described that state's difficulties and stressed that developing an automated recordkeeping system depends on a good paper system as its foundation.

Incorporating automated procedures with an already existing large system "requires parallel systems for five to 10 years," plus "large commitments of monies, personnel and equipment for which the administrator sees little return," he said.

"A major problem," he explained, is that "few people responsible for recordkeeping have much knowledge beyond their own agencies as to who needs or is served by records."

In New Jersey, Dalton explained, responsibility for disposition reporting was placed under the State Bureau of Identification in 1930.

"Courts were not reporting; prosecutors had no responsibility to report; police and corrections officials were struggling to maintain the system and report dispositions," he said. Adapting any automated system would have been impossible.

As a first step, an R&D team representing state police and the courts was assigned to develop a disposition system known as Court Disposition Reporting (CDR).

The team decided what information had to be kept and who had the right to see that information.

Once approval had been received from the Chief Justice of the State Supreme Court, a standard complaint form was put into effect throughout all jurisdictions in the state.

Then, in addition to the fingerprint card – the primary source document – the following forms were designed to capture disposition data: complaint-summons, complaint-warrant, county prosecutor criminal disposition report, county clerk criminal disposition report, county clerk change of criminal disposition report, county probation department disposition report and the conditional discharge final disposition report.

Evidence that the needs of a small city police department can be met by a minicomputer system was presented by Charles Gasior, criminal justice planner, Plainfield, N.J.

According to Gasior, Plainfield is lease-purchasing an Ultimacc minicomputer system with a 48K central processor, two disks with a total of 10 million characters of storage and three CRTs.

Gasior said the system has enabled the city to develop biweekly reports on all wanted persons, calls for police service, crime incidents by ward, traffic accidents, recovered property and criminal dispositions.

While ideally suited to a small city's needs, the minicomputer presented some problems with respect to programming language.

"Since the minis' small memory size precludes the use of too complex a programming language, great skill must be used in designing systems that actually work," he observed.

Search Group Defines Standards, Concepts For Crime Reporting

SACRAMENTO, Calif. – Minimum standards and model systems concepts for a total crime information system have been released by Search Group, Inc., formerly known as the Standardized Crime Reporting System Committee (Project Search).

The report identified and defined the required data elements of a crime-reporting system based upon the expressed crime information needs of law enforcement, prosecution, probation, courts, corrections, parole and criminal justice planners and researchers.

Included in the report is a set of prototype reporting forms for crime data collection, developed as the result of a nationwide survey of the needs of crime information users.

The collected data is expected to contribute to developing standards for reporting and maintaining criminal information, particularly when these systems are automated.

The next step is testing the system in an operational environment, according to O.J. Hawkins, Search Project group chairman.

(Testing will begin in several cities and counties later this year, Hawkins said, although it is not known at this time which cities will participate.)

High on the report's list of priorities are security and privacy of the criminal data that is stored and disseminated. The report also makes an effort to set standards for report retention and purging, devoting an entire section to management and control of information.

Copies of the report may be obtained from the group, now a nonprofit organization, at 1620 35th Ave., Suite 200, 95822.

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Hospital Systems Pay Off With Management Expertise

By Edith Holmes
Of the CW Staff

NEW YORK – Computer systems in hospitals pay off, not as a result of machine capability or the efforts of systems designers, but because management learns to make effective use of the information obtained from them, Jose Blanco Jr., president of Space Age Computer Systems, Inc. in Washington, D.C., informed medical and data processing personnel at a recent meeting here.

Defining "payoff" as "an economic advantage directly derived from the use of computers," Blanco said while most hospitals need the products of computer technology, some hospitals may not have the financial wherewithal to implement computer systems.

"Risking the possibility of oversimplification, a hospital computer system which cannot improve the bottom line of its income and expense statement is not needed," he asserted.

In addition to requiring a certain level of internal organization and management ability within the institution, a computer system only pays off if designed to integrate all facets of hospital operation, Blanco noted.

Computers and Medicine

"To speak of 'financial systems,' 'clinical systems' and so forth, is simply to denote poor architecture," he said.

Even when a hospital needs and has installed a well-designed system which produces information the institution can use, payoff will be nil "if the decision-making process isn't helped or directed by the availability of the information," Blanco emphasized.

For example, the automation of laboratory reporting is only justified when physicians pick up and act on results as they come back from technicians.

Computer applications commonly paying off for hospitals are those connected with such business functions as billing, receivables, payroll, inventories, payables, budget, financial statements, medical records and cost reports, according to Blanco.

He contended economic justifications for several other applications are more difficult to prove unless they are a part of an integrated information system.

Among these applications are reservations, appointments and bed control, laboratory reporting, retrospective medical audits, radiology information, electrocardiogram interpretation, intensive care unit monitoring, medical records unit number assignment, menu planning, preventive maintenance, infection surveillance and pharmacy medication profiles.

Blanco concluded there are hospitals with applications which have paid off in bottom-dollar figures in the statement of income and expense and have avoided additional costs and time on the part of attending medical staff.

System Identifies Doctors Not Meeting Professional Criteria

By Edith Holmes
Of the CW Staff

NEW YORK – A computer system is being used by Ohio physicians to identify the estimated 2% to 5% of doctors practicing medicine in the state who fail to meet "good medical criteria," Dr. James L. Henry, advisor to Medical Advances Institute (MAI) in Columbus and president-elect of the Ohio State Medical Association, told physicians and DP personnel here recently.

Designed to support Professional Service Review Organizations (PSROs), "our system must tell doctors what they need to do to continue to practice medicine if peer review legislation is to reduce the costs and improve the quality of medical care," Henry remarked.

"If a system can identify for a doctor what his additional educational needs are or where his procedures depart from those normally practiced in a particular hospital, the reasons for PSRO will have been served," he said.

A nonprofit organization, MAI goes into hospitals and conducts the review of physicians and osteopaths required by federal law as of last year [CW, April 17].

Having developed 279 disease-specific criteria which provide a norm for physician performance, MAI uses a computer to identify those cases where treatment doesn't follow standard procedures, according to Henry.

Operating in 27 hospitals ranging in size from 20 to 1,100 beds, the MAI system inputs information from all patient charts into Ohio State University's IBM 370/168 via Hazeltine terminals.

Programs written to identify exceptions to normal treatment procedures serve to narrow down the specific number of charts requiring review by licensed physicians, Henry commented.

"While leaving the review of particular cases strictly to the doctors, we keep physicians out of data collection and computer operations," he added.

Henry emphasized, however, that criteria used by programmers to isolate exceptional cases were devised by physicians.

"Over 22,000 physician-hours have been invested in developing these criteria," he noted.

Though public law No. 92-603 has established PSROs only for those patients under Medicare and Medicaid, Henry contended all patient charts should be reviewed if peer review is to be effective.

He argued that only because Ohio examines more than the 38% of all patient records requiring review can the system conclusively identify those doctors who don't meet professional standards.

In discussing the economic feasibility of implementing a review system for all patients, he claimed MAI can make its program operational on a statewide basis for $11 million annually.

Finally, Henry stressed the need to develop mechanisms for maintaining the confidentiality of patient records. He noted that "the confidentiality of any review system breaks down when a patient reveals all his records in an effort to keep from paying a bill.

"Physicians are almost more concerned with this issue than patients are," he explained, "because the revelation of a single record could influence public attitude toward a doctor's practice."

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Editorial

A Chance to Be Heard

A little-known bill squirreled away in the House Judiciary Committee could affect all users in the computer community.

The measure, commonly called the Tunney Bill and officially designated the Antitrust Procedures and Penalties Act (H.R. 9203), would require the Justice Department to disclose the reasons behind its settlement of large antitrust cases – such as the IBM case – if they were settled before trial.

That might seem a small thing – and the bill passed the Senate with ease – but its ramifications are enormous for computer users.

If the IBM case is settled out of court by the government, users will probably be the only ones who have not had the chance to make their feelings known in the case.

The other mainframe makers (with a few exceptions) have made their position on the matter known to the Justice Department, as have many of the peripheral equipment manufacturers and other independents either on their own or through the Computer Industry Association or other trade groups.

But users generally cannot afford to lobby for their position and therefore are often the forgotten people when such decisions are reached.

The Tunney Bill, however, could change all that.

In the case of a settlement out of court, the Justice Department would have to file the proposed settlement for 60 days before it could become effective. In addition, the department would have to file what amounts to a "public impact statement" outlining the possible effects of the proposed consent decree.

The department also would have to outline the reasons why it brought the suit in the first place and the relief that would be obtained in the settlement.

The public would then have a chance to comment, either pro or con, on the proposed settlement and the judge could call witnesses to comment on the consent decree in court.

It would be up to the judge to accept the settlement as proposed, make it more stringent if the parties agreed or order the case to proceed to trial.

Computer users and others should support the intention of the bill for two reasons.

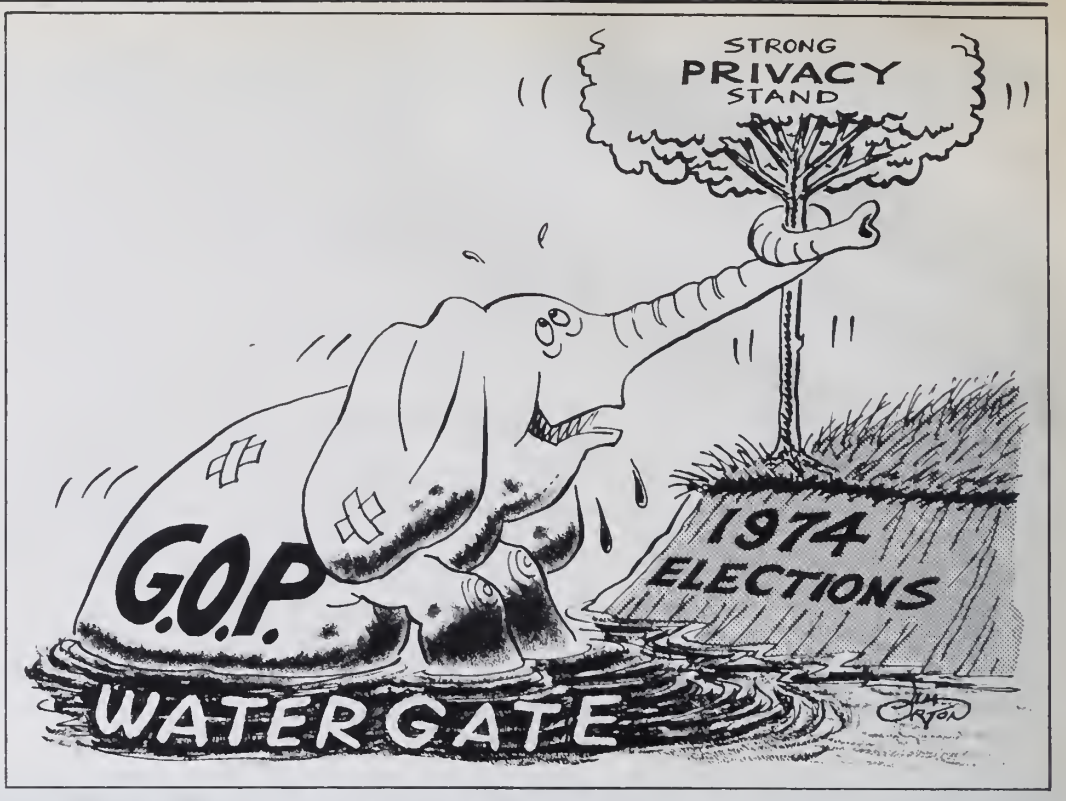
First, on a national policy level, the bill would open up discussion of out-of-court settlements in the antitrust area which would be to the benefit of society at large.

Secondly, and more personally, it would allow any user to comment on any proposed settlement the government might make with IBM, which does dominate the computer industry.

Once before (in 1954) the government accepted an out-of-court settlement in a major antitrust suit with IBM that changed little in the developing computer industry, and users or interested parties had little chance to be heard.

This should not happen again. If there is a settlement in the present case, users will be affected to a far greater degree than anyone else. They should be heard before any out-of-court settlement is slipped past them.

Users should write to Rep. Peter W. Rodino Jr. (D-N.J.) and urge him to take up action on the bill before this session of Congress ends. If they don't, they may well lose their voice in any possible conclusion of the IBM case.



Leverage

Letters to the Editor

'ECI, You've Really Blown It' In Defending 'Layla' Ad

Just who is Peter Katsoulas trying to kid?

In reference to his letter [CW, Sept. 11] explaining ECI Software Corp.'s Layla advertisement, I'd like to inform Katsoulas that we're sorry, but we're not buying that line any more.

Women have come to an appreciation of themselves, their abilities and their potentials whether it be in the home, the business world or any other area. (For Katsoulas' benefit I feel I must explain that I'm talking about abilities which are in addition to our sexual ones).

ECI does need an awareness program. Since they all enjoy music I would suggest for their first lession they listen to a song entitled "Woman" by Helen Reddy.

To further assist them, I would refer them to a *Computerworld* editorial, "An Excess of Sexism" [Aug. 28].

It may surprise Katsoulas, but I suspect the 30% of the women DP professionals responding to their ECI ad were in fact secretaries placing the calls for their male managers.

Furthermore, I find it very difficult to believe that in Katsoulas' 10 years "women have always held respectable, equal, well-compensated positions side-by-side with men," unless possibly Katsoulas was at some time a keypuncher.

If, in fact, a great deal of ECI's time went into the creation of their "cartoon character" so that sexual exploitation would not be a factor, then, ECI, you've really blown it. I would only hope that you've done a better job of planning on your resource scheduling system.

It is regrettable that ECI received only one letter on its ad, but many of us feel that such an ad and company is really beyond help and usually spend our time working where we can hope to see real progress.

Shirley Lerom
Programmer

Rochester, Minn.

They Did Twice the Work At Half the Cost in Indiana

It continues to amaze me that stories like "TP Monitor Separates Student, Administrative Data" [CW, Aug. 21] are written and published.

The case in point is not only rather unremarkable, it is grossly inefficient (by non-IBM standards at least)! Systems have been on the market for 10 years (like the Burroughs 5500) which do multiprogramming without the atrocity of fixed partitioning of main memory.

As a counterexample, we are presently using a 128K Hewlett-Packard 3000. This system is currently averaging three to seven simultaneous multiprogrammed jobs and supporting 12 terminals simultaneously (including seven CRTs).

Students, faculty and administrators all use the system at the same time and no one is in a bind for core space. Administrative applications include payroll, accounts payable, budget accounting, notes payable, alumni records, student loans, admissions records, catalog, class schedules, registration, student schedules and grades and class rosters and scores.

Ninety-five percent of this work is done remotely in the administrative office or classroom.

We are probably doing twice the work at half the cost compared with Lorain Community College. Yet such stories continue to persuade people that teleprocessing out of fixed partitions under DOS (or OS) is a reasonable and cost-effective thing to do.

If you don't have an interest in perpetuating archaic and inefficient modes of operation, please write some stories on the alternatives.

Thomas R. Harborn
Director
Computing Center

Anderson College
Anderson, Ind.

Who's for Smart Cross-References?

Many assembly language compilers have a cross-reference phase as an option. A user can either choose to get a listing of all symbols defined in the program or none at all. Usually the former is chosen.

Assembly language programmers often use macrogenerated symbols although only a small percentage of the symbols generated are actually referenced.

I believe, therefore, a user also should have the option of a "smart" cross-reference, one which will only list the symbols referenced rather than all symbols defined.

Do any readers disagree with this?

R.A. Sobieraj

Perth Amboy, N.J.

Spell It Out Please

I've been reading *Computerworld* for a number of years and consider it to be one of the best sources of computer information available. However, due to the increasing technological explosion it's becoming impossible to keep up with the numerous acronyms continually being invented.

I would greatly appreciate your consideration in defining acronyms when first stated in an article.

Doc Lee
Deputy Director
Data Processing Department

Naval Supply Center
Charleston, S.C.

We do. Ed.

Forty Countries

Many years ago, when there were only a few computers in the U.S., very few in Europe and none at all in Japan, a subset of the Unesco adherents established an international center in Rome. The idea was to install and operate a computer and, if possible, a powerful one. Work would be done primarily by academic and government visitors from the participating nations.

The U.S. and Great Britain, always cautious about already extensive Unesco commitments, and far ahead of other countries in the field, did not join. Several other possible partners also decided against initial participation. Membership was much more attractive, if much less expensive, for small countries – I seem to remember the U.S. fee was to have been $75,000 a year.

Without the computer knowledge and the income that American and British partnership would have brought, the project languished. There was a very small secretariat, a few publications, a list of computing laboratories worldwide – which I used very effectively in making European visits on behalf of CDC in 1962. But no computer was installed, And Ifip drew away the professional societies and the academic community.

In the last half decade some substantial improvements were made. A new name, Intergovernmental Bureau For Informatics (IBI), reflected a mission to exchange views about our trade between governments worldwide, with considerable emphasis on developing countries. The Bureau somewhat paralleled the OECD computer user panel, but for many more nations. Since the U.S. and UK were active in the OECD group, they continued to abstain from IBI membership. Nevertheless, a better director, Bernasconi of Argentina, and a more powerful secretariat became possible.

I've just returned from a major meeting in Mainz, where nearly 300 registrants from 41 countries heard a series of papers on the economics of computation (informatics, the preferred word outside the English-speaking countries). Authors and session chairmen were drawn from 14 countries, from Algeria to Switzerland and the U.S. I did the futures talk at the closing session; met my first co-victims from Kuwait and Nigeria and my old home base, Monaco. Of course, Ifip Stockholm had drawn delegates from more nations, but the emphasis there was heavily on archival quality research papers, and the attendees were largly professors.

In Mainz, a majority of the participants were government people, and they were grouped by nationality rather than by professional specialism – in fact, often seated that way, as in UN and OECD sessions.

Considering the market (central governments) represented, there was amazingly little interest from the manufacturers or from software houses. IBM was there, naturally – but not in force. No Siemens, no ICL; Cll was prominently represented, and Univac Netherlands showed the flag. For the first meeting in recent years, there were almost no Japanese. Weird!

One paper was of great interest to me. By a very impressive German from the research ministry, it gave for the first time detailed figures on German government support for their industry and universities. Looked like Siemens got most of the direct funding, which amounted to DM500 million over the last three years. Since Siemens' losses last year were reported to be very heavy, and since they have been forced to absorb the old Telefunken large-computer operation from Nixdorf (which also has financial problems of its own), it looks like my dour predictions in late 1971 that Siemens would be forced to pull out (in the General Electric/RCA mode) some time this year may yet come true.

It was a curious meeting. The Rhine was clean, the weather pleasant, the prices staggering, the company very good. I made new friends and, I fear, a few new enemies. For IBI, I would suspect the same comment holds true!

Herb Grosch

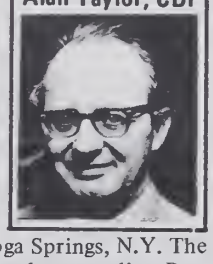
10 Days in September

Cobol Incompatibilities Make Burroughs User Beg

Ed Lohse, Burroughs director of standards, was the last manufacturer-representative to speak out against the latest Cobol standard. After he gave in, I asked him why. He told me his people had agreed Burroughs could live with it – even though it was full of ambiguities and incompatibilities.

But the fact that mainframers can live with it is no reason why the users can expect to do so. Indeed, the very ambiguities and uncertainties of the last Cobol standard are currently forcing one user to his knees in front of Burroughs, and no doubt are causing similar problems for other mainframers' customers.

The Taylor Report
By
Alan Taylor, CDP



The user concerned is John Gamble of Ashton Corp., Saratoga Springs, N.Y. The Taylor Report covered an earlier Burroughs/Gamble fight last June when Burroughs wanted Gamble to sign a contract which completely exempted Burroughs from responsibility for any system malfunction – even if Burroughs was clearly to blame [CW, June 19].

John Gamble, the company treasurer, has a phobia against blank checks, which is quite reasonable in my book. He also has service records showing installed Burroughs equipment had experienced years of inadequate uptime, even though Burroughs salesmen had told him it was reliable for service bureau work.

At this first confrontation the Burroughs weapons were:

(1) To agree that the equipment installed would be unable to do the job and to install part of an upgrade.

(2) To threaten to stop maintenance unless Gamble accepted the "blank check" contract.

(3) To enter the computer room under guise of preventative maintenance and to attempt to remove vital parts of the configuration (tape units) which would stop Gamble from doing any further work for his customers.

These weapons were stopped when it was discovered that Burroughs people were dismantling and not repairing the system. They were stopped just in time to prevent the tape units from being taken out.

And the other equipment, including the full upgrade and maintenance service was restored after Gamble agreed to try to stop me from publishing the Taylor Report so that other users would know about the Saratoga Springs happening.

By then, of course, Gamble had had enough of Burroughs. IBM was called in, and the effort to convert the programs over to IBM equipment began. Most of the programs are in Cobol – that "common business language" that both Burroughs and IBM support – yet the conversion has been anything but easy.

In point of fact it is not scheduled to be completed until mid-October. The reason – because Cobol is *not* a common language, despite its billing, and IBM 370 Cobol is not Burroughs Cobol.

The next Burroughs confrontation with Gamble was better detailed than the first one. To start, in August service was again threatened unless payment was brought up to date for the original configuration – although part of it was no longer on the premises! This was paid, under protest in view of the service problems. Then with cash collected came the real Burroughs blows, which at least temporarily have left Gamble the choice of groveling for mercy or else letting down his customers.

The blow came on Sept. 11. Burroughs gave a seven-day ultimatum to Gamble to either accept the blank check contract, or else the vital tape units would not be maintained after 5 p.m. Sept. 18. (Burroughs was prepared, it said, to maintain the original equipment – but not enough of that was present in the installation to run customer's jobs, and a service center running 24 hours a day is in no position to find a backup for over a month!

So Gamble gave in to the terms and, as requested, wrote a letter to the branch manager requesting the upgrade. However, having tasted blood Burroughs was apparently not satisfied. Gamble told me the branch manager called him at 5:20 p.m. on Sept. 18 refusing to accept the letter that he himself had requested. He now wanted something equivalent to a full redraft of the earlier negotiations between the parties to be developed, signed and sent by 5 p.m. Monday.

Effectively, this was a one-day ultimatum.

There was an out, however. If corporate counsel, Ugo Ippolito, was contacted and agreed to some other terms regarding the drafting of the contract or letter, the Albany branch would be nice to Gamble and obey his instructions. Big deal!

On Monday – the day before this was written, incidentally – Gamble asked to have this latest set of surrender terms put into writing – and found that the branch manager who had told him Friday to send the letter by Monday was mysteriously "on vacation." And Ippolito, who on Friday had been unreachable by Gamble's attorney, continued to be scarce despite person to person phone calls.

So Burroughs won its battle with Gamble.

It won through the simple fact that converting this purportedly common Cobol just cannot be performed quickly. If it could have been, then today Burroughs would be removing its equipment with Gamble's consent (and perhaps having to face up to the responsibilities it is currently trying to evade with the disgraceful contract forms.)

I wonder if this is what the Burroughs people really meant when they examined the new 1974 Cobol and told Ed Lohse "Burroughs could live with the ambiguities and incompatibilities."

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Contract Terms on Maintenance — Unfair to User?

John Gamble, treasurer of a small Burroughs shop from Saratoga Springs, N.Y., recently talked to me about the standard terms the Burroughs Corp. currently offers with its computers. He was wondering whether they were really professionally proper, when a user has an extensive amount of downtime. After they have on rental has sufficiently severe downtime, and his firm is buying thousands of dollars worth of machine time outside to make up for the lost time. As far as he can see it, agreement to such contract terms would effectively permit Burroughs to collect rent on a system which could never be re-

lawyers may find to argue about.

User Powerlessness

All illustration of the comparative powerlessness of the user when maintenance is taking a long time occurred apparently at Gamble's place just before Memorial Day.

There had been a continuing

the customer's statements are factually inaccurate; but on the advice of its legal department, is unprepared to identify any specific inaccuracy, or to say what it believes really happened. Burroughs also declined to provide any reasons why it required the wide protection which is included in the new (1972) con-

roughs'). Perhaps this is one the things that a real group independent computer use funded perhaps with the CI $50,000, could approach wit out having to force some po user to risk going out of busin in order to get it settled. Wh do you think?

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The Taylor Report excerpted above described the first Gamble/Burroughs confrontation, which Gamble seemingly won. However, he seems to have lost the second battle he was forced into because of Cobol incompatibilities. (See story.)

Letters to the Editor

The Certification Wrangle Continues

State of Specialization Ignored in Today's CDP

Okay, enough is enough. I've listened to the advocates of the Certificate Data Processing (CDP) long enough.

There are several flaws in the whole program.

I base my statements on these facts: the DP field is probably the most dynamic field there is today; the hardware technology is far ahead of the software technology, and software is ahead of the applications technology.

So how does this relate to the CDP program? Well, it's simple.

The year of certification should be included when an individual chooses to use the initial CDP, i.e., CDP-61, CDP-74.

Let's be honest, gentlemen. The individual who was certified in 1974 had to know a lot more about DP than the guy who made it in 1961.

Specialization is long overdue. There are applications programmers, software systems programmers, systems analysts, operators, managers, etc. The software systems programmer, if he is dedicated and interested in his job, might not be aware of the other aspects of DP and, what's more, he might not even care.

Specialization requires more knowledge each year. Why then aren't the advocates of CDP supporting a classification program that might produce something such as:

- CDP-74-Systems Software Programmer.
- CDP-72-Operations Manager.
- CDP-61-EAM Equipment Systems.

What is the real value of the current CDP program? Looking at it objectively, apparently not very much. The test covers every aspect of DP, but to what degree? So someone proves that he knows a little about everything but not much about any one thing.

So, to Al Smith [CW, Sept. 4], I say, "I think you're right, but not totally. The program must advance at the speed of the field it purportedly supports."

To Harold L. Estes [Sept. 18], I ask, "Is taking the CDP exam going to advance the profession and change the public's attitude?"

And the Jens Christensen [Sept. 4, 25], I ask, "Why don't you look at the list of those who hold a CDP and tell me how many are 'a middle-line manager who had his start in EAM and, all too often . . . [has] not progressed beyond this point'?"

I can say the same thing about the CDP program, can't I?

Stephen Kolarik
DP Manager

Warner & Swasey Co.
Worcester, Mass.

CDP Good for Job Changes

Fred Twepesta [CW, Sept. 18] doesn't need certification, as long as he stays in his present position. If his performance is as good as he says, then no other certification is valuable.

However, if Twepesta ever leaves his present position, that "other half" of things for which he sees no need will become important. In order to be considered for a new position, a candidate's qualifications must be judged; certification is a quick way to establish a minimum set of criteria.

It is highly unlikely that a change in job will not require a change in required skills.

There is no need to make special provisions for the "little guy" if this is a profession.

Jerry L. Ogdin
Software Technique, Inc.
Reston, Va.

Ethics Statement Important

Certification or a statement of ethics? Well, why not both?

I would dislike working next to a technician without ethics as much as I would dislike working next to an ethical person without technical ability.

Contrary to what Al Smith said [CW, July 3, Sept. 4], we *are* "in the marketplace affecting consumers."

Hardly a day goes by that one cannot read about someone being hurt "by the computer;" billing errors are common and people are arrested or their cars impounded because someone forgot to include duplicate record checking.

I would hope that any statement of ethics would include something about taking into consideration the final user, be he the company accountant or an unsuspecting citizen.

I believe Smith has a good idea in the statement of ethics, and I certainly endorse his warning about a certification program excluding some good people, though I do not endorse his call to drop it [Aug. 21].

A statement of ethics, however, cannot stand alone. Witness all the public officials who swore to uphold the Constitution (a statement of ethics) only to ignore it later.

Some people might sign the statement of ethics because of peer group, and probably management, pressure without considering whether they could, or would, support every item in the statement.

Perhaps people who pass the CDP exam could be required to sign a statement of ethics before they are issued the certificate.

As to Jens Christensen's suggestion that no one is ever fired for incompetence [Sept. 4], I disagree. People are fired for incompetence, but quite often it is covered up.

These are not called firings because of various reasons, chief among them, as Christensen said, management's reluctance to take responsibility for a hiring that backfired. And sometimes the firing is disguised out of compassion.

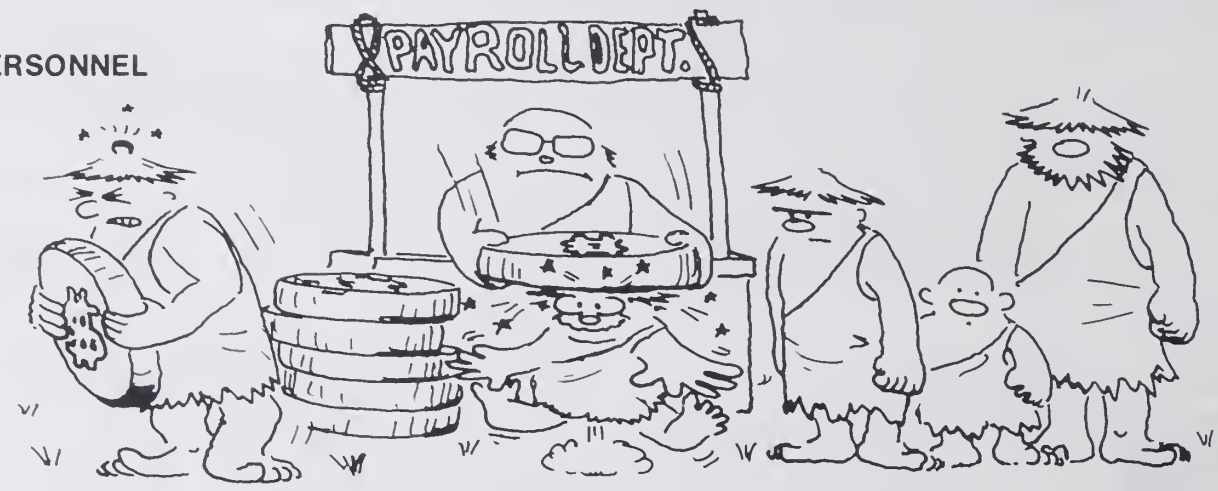
The sad thing is that some of these people "quit" job after job and still stay in the DP field.

Perhaps with a voluntary certification program, which includes a statement of ethics, we might clean up the profession. But remember that the importance that management places on it will vary drastically from company to company, and perhaps that is as it should be.

One more idea: how about separate certification for each group within the profession (programmer, coder, analyst, designer, manager, technical writer, etc.)? Has anyone got a good set of job descriptions?

Al Curras
Newark, Calif.

HISTORY OF
PAYROLL/PERSONNEL
PART 1



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After Job Begins Running

Detection, Recovery Strategies Can Minimize Failures

By Don Leavitt
Of the CW Staff

NEW YORK – Software failures will occur in almost any project of any size, and the programming staff better have a plan to cope with these bugs, warned Dr. John B. Goodenough, director of programming technology at Softech, Inc., at a meeting here recently.

The impact of bugs found after a job is in production can be minimized through software design, he said, but to have this protection users must have both detection and recovery strategies.

The Waltham (Mass.) based technician noted that the approaches to failures depend on three basic elements: the application requirements, computer system capabilities and a decision on the effect to be minimized once a bug is discovered.

"What is being done? What types of failures might occur, and what effect could they have?" Goodenough asked, noting that recovery methods differ with the criticality of the failure to the application.

A failure in process control or in an avionics system is "probably" more critical than a failure in a batch-oriented payroll run, he commented.

The array of possible system configurations available to a systems planner also has a bearing on the problem, he said. The options of using multiple memories, multiple processors, time-shared vs. batch approaches and distributed or centralized data bases all impact the way recovery can be handled.

Each configuration has potential good, but hazards are also present, Goodenough went on. Distributed processing spreads the workload, for example, but creates more sources of failures and a more complex job of synchronizing the recovery effort if that becomes necessary.

Vulnerability Determines Method

Recovery methods differ depending on what kind of vulnerability is to be minimized. Users can reduce the mean time to bring a system up, the mean time to restore damaged files or the mean time to recover lost work.

Failures occur basically because of violations of assumptions made by the analysts and programmers who built the system, Goodenough said. A recovery strategy requires identification of the assumption that was violated and an understanding of the effects of the violation.

"Defensive programming" sums up one strategy that is geared to detect violations before they cause damage, he continued. Programmers should insert multiple ("redundant, if you like") tests to detect the flaws, and invalid data must be represented in such a way that its misuse is obvious.

To illustrate this point, Goodenough described a system in which men's heights were being recorded, along with other data. If a height was not specified, the system "plugged in" the value-1, which the designers felt would be a distinctive flag.

When measurements were considered individually, the system tested for and disregarded the flagged records. But they were also fed into a routine to determine averages, including average height.

In this case, no test was made; the records (and values) were included, and the results were "fascinating."

Recovery strategies have to consider both known and unknown reasons for failures, Goodenough added. "Undo" facilities to reverse actions taken at a keyboard might be built into interactive systems, but file recovery strategies and clean-up routines are needed when discovery occurs at a time different from the cause of the failure.

An undo approach makes recovery from error simple for the interactive user, but it can be costly in system resources. In addition, it is not particularly effective against hardware and preprogrammed software errors, he said.

Clean-up routines differ from file recovery efforts since they are intended as means of making the system available as soon as possible without regard to recovering lost information, Goodenough remarked.

Clean-up entails restoration of data fields and perhaps damaged instructions to valid internal states so that processing can get started promptly, even if in a limited way, he concluded.

Random Notes

More Than 370 Subroutines Included in ISML Library

HOUSTON – International Mathematical & Statistical Libraries, Inc. (IMSL) has announced the IMSL Library 2, including source code for more than 370 Fortran subroutines, will be available for use on Honeywell 600, 6000 and 66 series mainframes in December.

The annual subscription to the library also entitles users to consultation with IMSL as well as full maintenance of the routines, the vendor noted from Suite 510, 6200 Hillcroft, 77036.

Univac-Oriented Packages Available for TDOS, VMOS

BOSTON – Users of Univac Series 70 computers operating under either the TDOS or VMOS environments may now use Version 3.0 of the Integrated Data Management System (IDMS) and Culprit output processor from Cullinane Corp.

The Univac-oriented packages have been field-tested and are now ready for regular distribution, Cullinane said from One Boston Place, 02108.

Customized Process Studies Offered For Continuous or Batch Processing

BARTLESVILLE, Okla. – Processing plant studies that may take only a few days and in-plant testing, data collection and analysis that may require several months mark the range of support said to be provided under a custom-designed process study, analysis and optimization service offered by Applied Automation, Inc.

The service covers "all types of continuous or batch processing" for the petroleum, petrochemical and process industries, the vendor said, and includes a study team backed by analog and digital computers, simulator software and mobile "optimization vans" equipped with measurement equipment. The firm is at Pawhuska Road, 74004.

Data Base Management System Provided for Wang 2200 Minis

NEW YORK – The Express File Manager (EFM) described by Express Software Systems, Inc. as a data base management system for the Wang 2200 minicomputer, provides file maintenance and inquiry capabilities and a "package" of subroutines to ease the implementation of user applications.

EFM supports file creation as an interactive process in which the user enters a description of a file and all of its logical parts in an internalized system dictionary. Segments and fields within the segments are also described in the dictionary.

Once the dictionary is created, the system prompts the operator during creation of the actual data base. After it is entered, the data can be queried, extended, deleted or modified by command without further programming.

EFM supports 16 levels of hierarchical file structure and 16 segment types, the vendor claimed. Uses and facilities available follow the same terminology as IBM's Information Management System (IMS), a spokesman added.

Several versions of EFM are available. The smallest runs in 16K of memory, but versions with more extensive management services run in 20K, 24K or 32K memories.

The working set of the EFM system, where query and updating in-place is all that is needed, takes only 10K to 12K, leaving "a great deal of room" for the user's application coding, Express said.

Distributed on two tape cassettes for immediate loading and use, EFM costs $5,000 per site with multiple unit discounts available. The vendor is at 20 E. 46th St., 10017.

Non-DP Users Can Query Files With 'Super' Retrieval Package

CLEVELAND – A Sycor 340 system, used in stand-alone mode, is all the equipment needed with the Sohio Useful Passkey Entry and Retrieval (Super) package developed by and available from Standard Oil Co. of Ohio.

Super allows the non-DP-oriented user to browse through stored files on the basis of keywords and "plain English" requests.

Responses to the search argument are consecutively flashed on the 340's CRT screen, after which they can be output on the unit's line printer on a user-selected basis for further reference.

The user can interact with the system at all times and thus is able to expand or limit the search key as results are produced. There is no need to wait for help from the DP staff, to be flooded with information that is not relevant to the research or to be "starved" with too little information, a Sohio spokesman noted.

Creation and maintenance of the files used by Super is also handled in English and no programming or other DP skills are needed for that part of the operation either, the company said.

Super, as originally designed, should be useful for companies with files containing "up to 5,000 technical reports," Sohio said, adding that, for larger files, subsets have been developed to increase the capacity of the retrieval system.

Apparently because the company is interested in working with potential users to shape Super to particular situations, the license fee for the system is negotiable.

Inquiries should be directed to Vincent Young in Sohio's Patent and Licensing Division at the Midland Building here in Cleveland, 44115.

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For Screen Definitions

Preprocessor Slashes Debugging Time

CHARLESTON, W. Va. – Even junior programmers may be able to produce and debug screen definitions quickly and easily for IBM 3270 CRT terminals running under IMS with a format utility preprocessor developed by Ron Elswick.

The package substitutes a user-defined set of 24 card images, each representing a line on the 3270 screen, for the more highly structured coding normally required by the IBM utility.

Elswick's logic is designed for batch mode but can be adapted to on-line environments, he said.

The screen definitions created by the IMS-3270 support package include message input and output descriptors and definitions of input and output fields.

Field and literal definitions are generated through the use of control characters, and options available include normal or high intensity, alpha or numeric fields, right or left justification and zero or blank fill.

Backing his claim that the preprocessor can save time and decrease the degree of programming skill needed to set up the 3270 screens, Elswick said a programmer trainee with less than six months' experience was able to generate three "very large interrelated" screens and make them available for programming in two and a half days.

Normal coding, keypunching and debugging without the use of the preprocessor would have taken "at least two weeks" for an experienced programmer, the developer said.

The package appears to be somewhat similar to the Installed User Programmer (IUP) offering from IBM, but Elswick's program, written in Assembler, runs in 12K under OS. The IUP package requires "about 40K," Elswick estimated.

Source code and a user manual for the Elswick package is available for $500 from the developer at 5285-B Kensington Drive, 25312.

NCR Releases Student Records System Modules

DAYTON, Ohio – NCR has released the first three modules of a student records management system that runs on any 32K Century configuration and handles 25 schools, 1,000 classes and 4,000 teachers under a single data base.

The School Automated Records System, called Scholars by NCR, currently includes a control module for data entry and validation; a data base module for managing the data storage; and the student scheduling module, which the vendor said is the first of "several" applications in the new system.

Three more modules – grade reporting, attendance reporting and academic history – are scheduled for release early next year. Another, supporting testing and evaluation, will be available in mid-1975, NCR added.

The use of a single data base means much redundancy is eliminated, compared with systems in which each application has its own files. But more than one school may use the system and still retain its individuality, a spokesman noted.

For example, the scheduling module may be used to set days based on conventional, fixed periods or on time modules that can be linked together to create class periods of differing lengths. Scholars also allows "chaining" within and across semesters, "lockouts" of specified groups of students for specified periods and class balancing when that becomes necessary.

The system accommodates as many as 30 requests per student, four semesters and 500 rooms. The scheduler generates class rosters, inactive student lists and student identification audit runs.

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Clear Coding Style Can Cut Need for Nested IF Tables

By William B. Simmons
Special to Computerworld

The nested IF is an extremely powerful logic tool and should have wider use than it currently enjoys. Many a time I've clashed with a programming manager who had that old ingrained fear J. Dennis Omlor mentioned [CW, Sept. 4].

Needless to say, I support Omlor's contention that nested IFs can be made understandable. However, I think he has overlooked something.

Concepts and Techniques

The term "structured programming" has many meanings. It implies not only a formal logical organization of program functions but also a way of coding them. Such seeming trivialities as number of words per line, indentation and blank lines strongly affect the readability of a program, as any practicing programmer can attest. Specifically, no experienced Cobol coder would ever have written the statements that Omlor gave as examples.

In raising the subject of coding styles, I risk becoming a nitpicker. By no means do I wish to downgrade Omlor's contribution; the technique he has developed will be invaluable to any maintenance programmer who has to pick up an unfamiliar program and quickly decipher a badly written IF statement.

My sole aim is to point out that coding style has a profound effect upon the nested IF (perhaps more than any other Cobol statement) and that a good, clear style can eliminate the need for truth tables.

Let's assume we're doing a simple sequential update. There are three types of transaction cards: type "A" to add a record, "C" to change or update and "D" to delete. Assume also that we are using some variation of the balance line or low-key collating method and the presence or absence of a valid record in the output area is indicated by a switch. The valid condition could conveniently be assigned the condition name "VALID-MASTER."

Lastly, assume that add and change cards must be edited and that a valid card has associated with it the condition name "VALID-TRANS."

Many a Cobol textbook I have seen would have illustrated this example with the following code:

```
0100    IF 120-CARD-CODE = 'A'
0200    IF VALID-MASTER PER-
0300-   FORM 530-CANNOT-ADD
0400    ELSE PERFORM 532-
0500    EDIT-ADD-CARD IF
0600    VALID-TRANS PER-
0700-   FORM 534-CREATE-
0800    RECORD ELSE PER-
0900-   FORM 536-INVALID-
01000   ADD-CARD ELSE IF
01100   120-CARD-CODE = 'C' IF
01200   VALID-MASTER PER-
01300-  FORM 538-EDIT-
01400   CHANGE-CARD IF VAL-
01500-  ID-TRANS PERFORM
01600   540-CHANGE-RECORD
01700   ELSE PERFORM 542-IN-
01800-  VALID-CHANGE-CARD
01900   ELSE PERFORM 544-
02000   CANNOT-CHANGE ELSE
02100   IF 120-CARD-CODE = 'D'
02200   IF VALID-MASTER PER-
02300-  FORM 546-DELETE-
02400   RECORD ELSE PER-
02500-  FORM 548-CANNOT-
02600   DELETE ELSE PERFORM
02700   550-INVALID-CARD-
02800   CODE.
```

(Continued on Page 16)

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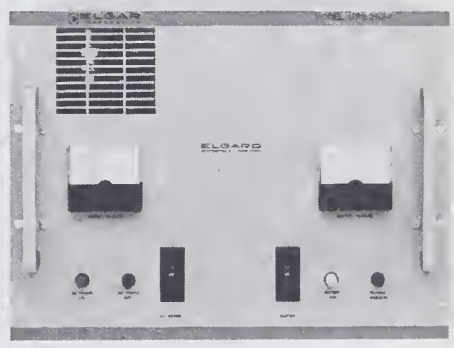

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Clear Coding Can Cut Need For IF Tables

(Continued from Page 15)

This would be perfectly legal Cobol and Omlor's method would be a valuable means of breaking it down into understandable units. But what if the problem had been coded another way?

```
0100
0200
0300  IF 120-CARD-CODE = 'A'
0400     IF VALID-MASTER
0500        PERFORM 530-CAN-
0600        NOT-ADD
0700     ELSE
0800        PERFORM 532-EDIT-
0900        ADD-CARD IF VALID-
1000        TRANS
1100           PERFORM 534-
1200           CREATE-RECORD
1300     ELSE
1400        PERFORM 536-INVAL-
1500        ID-ADD-CARD
1600
1700  ELSE IF 120-CARD-CODE
1800  = 'C'
1900     IF VALID-MASTER
2000        PERFORM 538-EDIT-
2100        CHANGE-CARD IF
2200        VALID-TRANS
2300           PERFORM 540-
2400           CHANGE-RECORD
2500     ELSE
2600        PERFORM 542-IN-
2700        VALID-CHANGE-
2800        CARD
2900     ELSE
3000        PERFORM 544-CAN-
3100        NOT-CHANGE
3200  ELSE IF 120-CARD-CODE
3300  = 'D'
3400     IF VALID-MASTER
3500        PERFORM 546-DE-
3600        LETE-RECORD
3700     ELSE
3800        PERFORM 548-CAN-
3900        NOT-DELETE
4000  ELSE
4100     PERFORM 550-INVAL-
4200     ID-CARD-CODE
```

If the statement were coded in this second manner, would Omlor's technique tell us anything more? Would a truth table be any easier to comprehend than coding that has been arranged in a tabular manner?

The usefulness of tables is based upon the simple fact that the human eye works best on straight lines. Columnar displays (i.e., tables) simply make it easier for us to find a particular piece of data that interests us.

Perhaps this is obvious, but far too many people still ignore the obvious.

For example, when I was learning Cobol, I studied from a book that gave all its examples in the tightly packed, run-on style illustrated in the first example. No doubt, the publisher saved a bit of paper, but I went to my first job with some bad coding habits.

But all of us have gradually evolved styles more or less like that of the second example. Experience is a painful teacher and perhaps the most painful experience for a programmer is to be unable to follow his own logic.

William Simmons is a free-lance programmer based in Montreal.

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Canadian Bank Implements Payment Distribution Plan

By T.M. Whiteman
Special to Computerworld

MONTREAL – A computer-based payments distribution service designed for organizations that make regular payments to a large number of poeple either in one location or at a variety of places across the country has been implemented by the Royal Bank of Canada.

The bank has about 1,300 branches and believes the new service is the first of its kind here. It differs from existing systems because it is based on input from the client's own computer.

Payroll, pension, interest and annuity payments are among the kinds of transactions the service is designed to handle.

According to a bank spokesman, participating companies use their own DP equipment to compute the amounts owed individuals and forward the information to the Royal Bank of Canada. The bank then deposits the amounts in the individual payee's accounts at any financial institution in Canada.

In the case of payroll payments, clients continue to process their payrolls through their own computerized payroll systems. Instead of printing checks, the company forwards the computer data to a branch of the bank or one of its DP centers.

The Royal Bank, in turn, handles the data through its own processing facilities. In areas serviced by its data transmission network, the bank ensures that the net amounts owing are credited on a next-day basis.

If required, checks, earning statements and deposit statements can be generated.

Computer Aiding Fort Restoration

LOUISBOURG, Nova Scotia – A computer is helping recreate the Fortress of Louisbourg, once the pride of France but later destroyed by the British in 1760.

The fortress, built to guard the St. Lawrence route to the American Colonies and the Grand Bank fisheries, remained relatively undisturbed until restoration began in the 1960s.

While archeologists were excavating the King's Bastion, the largest building on the site, historians searched for information about the fortress and the adjoining town. They accumulated 600,000 pages of documents and more than 500 maps and plans.

Jim Henderson, assigned to cataloging the large number of documents for further study, suggested using a computer for the large supply of cross-reference material that would be needed.

Construction has been slow as the builder desires exact authenticity in the smallest detail. But Henderson said the computer catalog has proven invaluable.

Library a 'Millionaire'

COLUMBUS, Ohio – The Ohio College Library Center's (OCLC) data base of bibliographic records has hit the one million mark.

Frederick G. Kilgour, OCLC's executive director, called the millionth record "a milestone in library cooperation."

OCLC's on-line shared cataloging system became operational in August 1971. At that time Ohio University in Athens, Ohio, became the first of 50 academic libraries in the state to use the system. Presently over 300 libraries in 22 states and the District of Columbia use the on-line system to catalog books.

Earth-Movers Keep Moving

SACRAMENTO, Calif. – Users of giant earth-moving equipment here are saving thousands of dollars annually by forecasting major failures in internal components and quickly replacing faulty parts at the construction site.

These farmers, loggers and contractors subscribe to an engine and transmission oil sample analysis and a computer-supported parts exchange program offered by Tenco Tractor, Inc., a Caterpillar dealer operating in 10 northern California counties.

Tenco stocks an inventory of 20,000 different parts. An IBM 360/20 keeps tabs on the stock, projects future inventory needs based on past turnover, generates customer invoices and automatically reorders items in time to prevent gaps.

Owners regularly send samples of their equipment's lubricating oil to Tenco for lab analysis. When moving parts begin to wear, microscopic particles of metal appear in the lubricating oil. Then, according to which metal particles (copper, aluminum, chromium, iron) appear, Tenco technicians can determine the deteriorating parts before they fail.

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Displays, Discussion Attract 1,200 Users

SAN DIEGO, Calif. – More than 1,200 users and visitors attended the 12th annual conference and exhibition held by the Telecommunications Association (TCA).

Incoming president of the user organization is Nick Long from C.F. Braun & Co. who will serve with vice-president Hank Kramer of Montgomery Ward. Other new officers include Dan Grove from Valley National Bank (secretary), Don Shearer from Aerojet General (treasurer) and Merle Breedon from the Santa Fe R.R. (conference director).

Long said he was very interested in the suggestion by keynote speaker Howard Hawkins for an annual conference that would bring together users, carriers, regulators and policymakers. He said it was too early to determine whether TCA could work to help implement such a meeting but he said the proposal would be studied carefully.

More than 70 vendors displayed data and other products and services at the show. One of the biggest changes seen at any recent communications conference was made by Pacific Telephone & Telegraph (PTT) which showed its products in a "living room" environment. The exhibit marked a radical departure from the usually bland Bell System displays, according to several attendees.

Among the newer carriers exhibiting were American Satellite and RCA with satellite services.

Multimode Data Set Leads Variety of Modem Exhibits

By Ronald A. Frank
Of the CW Staff

SAN DIEGO, Calif. – A 9,600 bit/sec modem which can operate at a variety of switch-selectable transmission modes highlighted the products introduced at the annual conference of the Telecommunications Association (TCA).

The Modem 96 Multimode from International Communications Corp. (ICC) improves on previously available high-speed data sets by offering 9,600 bit/sec dial backup capability on phone lines with good enough quality. Lower speed dial backup is also standard.

The Model 96 can operate in most transmission combinations up to four lines, changed by slide switches on the front panel. The user can select one 9,600-, one 7,200- and one 2,400-, two 4,800-, one 4,800- and two 2,400-, or four 2,400 bit/sec configurations depending on network requirements.

An individually controlled carrier on each of up to four ports in the modem allows the user to select one for local or loop-back testing when needed. Seven diagnostic indicators help isolate trouble on a malfunctioning port while the remaining ports continue normal transmissions, ICC said.

The MOS/LSI unit includes phase jump protection and a multipoint polling feature not available on most other 9,600 bit/sec data sets, the company noted. The unit has an all-digital equalization sheme that includes a training sequence of "140 msec on poor lines and 70 msec on good quality lines," the firm added.

The modem costs $240/mo with full diagnostics or $9,990 purchase. A limited version without the full diagnostics costs $230/mo with first deliveries set for November from 8600 N.W. 41st St., Miami, Fla. 33166.

Bell-Type Modems

General Datacomm Industries showed its GDC 208A 4,800 bit/sec data set which is described as fully compatible with the Bell 208A modem. The device utilizes automatic adaptive equalization and has 4,800 dial backup capability.

Designed for multipoint polled and point-to-point networks, the GDC 208A has local and remote loop-back capabilities. The unit is priced at $3,200 purchase only on a 30-day delivery from 131 Danbury Road, Wilton, Conn. 06897.

Another Bell-compatible data set was shown by Rixon, Inc. which displayed a 2,400 bit/sec unit that is said to be interchangeable with the Western Electric 201C and 201B. The synchronous modem can operate on two-wire or four-wire unconditioned private lines or on two-wire dial-up facilities.

Diagnostic features include analog loop-back, receive-only and remote test indicators, and digital loop-back. The private-line version costs $1,100 purchase while the dial-up modem is priced at $1,300.

CW Photo by Ronald A. Frank

George Kushin of ICC shows Modem 96 Multimode.

Lease plans are also available from 2120 Industrial Pkwy., Silver Spring, Md. 20904.

Both the General Datacomm and Rixon units can operate on the same line with a Bell modem on the other end.

Two firms showed new models of existing equipment with Hycom introducing a 4,800 bit/sec polling Model 505 of its previously announced MOS/LSI modem line. The $3,000 unit is available from 16841 Armstrong Ave., Irving, Calif. 92705.

Livermore Data Systems, Inc. had an eight-channel version of its LDS-665 data concentrator for low-speed (up to 300 bit/sec) asynchronous networks. The unit can operate with Bell 103 or 113 or equivalent modems and costs $1,995 purchase from 2050 Research Drive, Livermore, Calif. 94550.

Phone Customers Profit

Both General Telephone and Pacific Telephone and Telegraph displayed non-Bell equipment which they plan to provide soon for their phone company customers in California.

General has filed for approval to offer the GE Terminet 1200 and PTT expects to add the Plantronics Comset CRT display by the end of the year. If the proposed California tariff is approved, the small display will be available for about $30/mo plus a one-time installation charge and the monthly rate for a phone, a spokesman said.

Cable and Wireless Ltd. from Britain showed the Mac-Net intelligent CRT system which it offers with an Extel printer for about $250/mo with maintenance. The company plans to offer leased equipment to West Coast users next year. At present, it services the East Coast.

The CRT system, produced by Megadata, is designed for operation on 83B3 polled networks operating at 75 bit/sec, a spokesman said. The equipment is provided by C&W Technical Services, Inc., Whippany, N.J. 07981.

CW at TCA

Keynoter Calls for User-Carrier 'Give-and-Take'

SAN DIEGO, Calif. – Despite continuing advances in telecommunications, users and common carriers know little about each other's long-range plans and needs, according to Howard Hawkins, executive vice-president of RCA.

Delivering the keynote speech at the annual conference of the Telecommunications Association (TCA), Hawkins said "users are not giving the carriers the advance information they need to adapt their services most effectively to coming customer requirements.

"On the other hand, the carriers are too absorbed in technological problems to explain what is coming off the design boards and what can be done with it." The exchange of knowledge is inadequate to the needs, he told conference attendees.

Another gap in information occurs in the regulatory and policymaking areas, Hawkins said. "The government has staffs of specialists to look into the latest technological developments, but it does not have comparable knowledge of user developments.

"Without a feel for the practical uses of communications as well as the means, the government is handicapped both in policy and regulatory functions."

As a solution to this deficiency in informational interchange, Hawkins called for an annual conference to be jointly sponsored by a major technological organization "broadly representative of the communications carriers"; an industry group such as TCA representing users and major universities; plus the FCC and other government agencies. He described such a meeting as "a forum where carriers, regulators and policymakers would come together to examine problems of common interest."

Perfect Position

A major revolution to business operations is under way, Hawkins told TCA members, and "the communications managers are in the very best position to provide the knowledge and recommend the necessary innovative actions."

Company communications need major changes, Hawkins said, as he suggested a review of the entire corporate process.

"The potential for communications to alter business operations for greater efficiency at lower cost has seldom been thoroughly considered, and I suggest this will be a major communications management function of the future."

Citing some examples of major changes, he said 35% of most stored papers could be destroyed and never missed. In contrast, a message could be stored in a CPU and retrieved whenever necessary at less cost than is now required to produce the hard copy.

Calling attention to the emerging advantages of domestic satellites, he said these will make it possible to communicate with digital accuracy at megabit speeds. With multipoint access to and from satellites to any number of earth stations, domestic satellites have cut the cost of a data circuit from New York to the West Coast from $2,200/mo to $1,100/mo, he added.

Satellites also make possible high-speed data networks directly linking man and machine, and machine and machine. To implement this link, low-cost earth stations will be small enough to be placed on the top of buildings so that no point will be beyond reach.

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Provide Cost, Management Guides

Users Share Noncarrier Experiences

By Ronald A. Frank
Of the CW Staff

SAN DEIGO, Calif. – Users with recent operating experiences on noncarrier communications systems provided some helpful guidelines to attendees at several Telecommunications Association conference technical sessions.

The subject of hidden costs associated with customer-provided equipment was addressed by C.M. Huntley, director of telecommunications at Continental Airlines. He told attendees that a decision to switch to noncarrier equipment means the telecommunications manager will have to devote a significant amount of time to defending his reasons for such a move.

The decision to switch will have to be defended to both management and the local phone company which will bring pressure to make the user reconsider his decision.

Huntley also described the difficulty in placing a monetary value on system failures. In making a fair comparison between tarriffed and customer-owned equipment, some consideration must be given to revenue losses caused by system failures. The addition of more capability can be a hedge against the chances of having a system failure, he suggested.

In a related area, the telecommunications manager must devote extra time to "internal corporate management" associated with the selection of noncarrier equipment. And from an operational standpoint after the new system is installed, "it would not be unusual to allocate . . . eight to 16 hours per week of additional corporate management time" to administer customer-owned systems, he said.

Another advocate of utilizing noncarrier equipment was Walter Long, director of communication and utilities conservation at General Dynamics, who warned users that "it takes a lot of courage to get out from under the Bell System blanket. Stand on your own two feet and manage your company's dollars in a competitive business atmosphere," he advised the conference attendees.

Long said he congratulated those users who had installed noncarrier systems as "the real pioneers of our profession.

"To try non-Bell services, my sincerest sympathy," he added.

Packet Switchers

The advantages of the packet switching nets were explained by Dr. Lawrence Roberts, president of Telenet Communications Corp., who told a session that his company would begin operations early in 1975.

Among the applications best suited to packet networks, Roberts mentioned point-of-sale and credit verification. He said large users now operating nationwide private-line systems might save as much as 50% to 60% over current costs by using the Telenet network.

Typical private-line nets today cost the user about $3 to $5 per hour for such applications as order entry and time-sharing, Roberts estimated. Using Telenet, these costs would drop to $2 per hour including the cost of the packets, the dial-in charge and local access to the host CPU, he said.

Another packet capability was described by Lewis Hill, staff specialist with McDonnell Douglas Automation Co. Known as Macautonet, the company plans to offer the nonregulated packet switching service beginning in January, Hill said. The service will be available to McDonnell Douglas customers only in relation to other DP offerings, and the Macautonet will provide more than transmission capability, Hill said.

Citing significant differences between the Macautonet and Telenet, Hill said his firm has a "multiple star configuration" while Telenet plans a ring configuration network. Telenet, like its predecessor the Arpa network, will link processors "and a limited number of terminals connected in a ring with multiple cross-over routing." In contrast, Macautonet will only have a limited number of processors, he explained.

At each node only a limited amount of data enters the Arpa (and Telenet) network, while all of the local and remote data can enter Macautonet. Also, Telenet will initially handle slower speed interactive terminals, although this will be expanded to support higher speed devices. Macautonet will support "all terminal types and data speeds," Hill said.

While Arpa and Telenet have variable routines between nodes which permit some thrashing in case of node overloads, the Macautonet utilizes a fixed routing between nodes. In this configuration data thrashing is not possible and data packets are not received out of synchronization.

The two systems are similar in that they both support data transmission via satellite and they offer redundancy in data transmission, he said.

CW at TCA

ITT World Communications lured attendees to exhibit with robot that stopped users in the aisle.

CW Photos by Ronald A. Frank

Walter Long
". . . takes a lot of courage"

Dial a Data Set Test

SAN DIEGO, Calif. – At a session on fault isolation techniques, Tene Doucette from the telecommunications staff at Hewlett-Packard told attendees that Bell has special numbers in nine cities that can be called locally or long distance to test a data set suspected of malfunctioning.

The test requires two phones for establishing the looped-back connection, then two modems can be tested in half-duplex or one modem can be tested in full-duplex mode, he explained.

Using this procedure, the first phone number in a city is called from phone number 1. When a partial ring and some clicking is heard, the first connection to the loop-back is complete. The user should then call the second test number in the city on phone number 2.

After this second number is dialed a short answer-back tone of approximately two seconds will be heard. When the short tone stops, the user must speak three distinct sounds into both phones simultaneously* to hold the loop-back and keep it from disconnecting, Doucette advised.

The user will have about five seconds to do this before being disconnected.

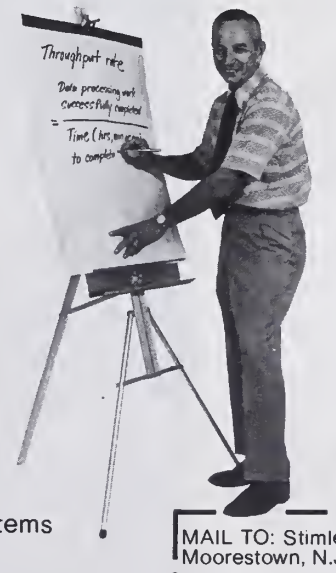
The next step is to put both phones in data mode on a dial-up facility or the user should enable his portable data set if he is on a regular business line. Both calls will be billed at regular long distance rates, so it is best to plan tests for short connections, he said.

The dual test numbers are available in Seattle, Boston, New York, Washington, D.C., Atlanta, Chicago, Denver, Dallas and Los Angeles, Doucette said.

Specific test numbers are available from local Bell maintenance engineers or from Doucette at 1501 Page Mill Road, Palo Alto, Calif. 94304.

A seminar from the man who wrote the book on computer performance evaluation and improvement—

Saul Stimler



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The seminars are designed for all levels of data processing management, systems analysts and systems engineers.

Tuition is $250, which includes all visuals, luncheons and refreshments.

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Session Speaker Claims

Private-Line Net Outages Man- Not Machine-Made

By Ronald A. Frank
Of the CW Staff

SAN DIEGO, Calif. – Most outages on private-line telecommunications networks are man-made, rather than caused by technological problems, according to Edward Taylor, vice-president of SP Communications.

Therefore, he continued, "the 300 maintenance men of the specialized common carriers cannot contribute the amount of outages that the 80,000 maintenance man force of the [Bell System] can."

Speaking to a TCA session about the advantages of the specialized carriers, Taylor challenged anyone who doubted the statement that most problems are man-made to compare the performance on their data circuits operating at night and on weekends with those operating between 9 a.m. and 5 p.m. Monday through Friday.

The specialized carriers optimize their system to serve the private-line user since he is the only user, Taylor said. In contrast, the phone company must make compromises between the demands of dial-up users which make up 80% of their business and the demands of the private-line user, he claimed.

Since a major portion of the Bell System's costs are related to local loops, AT&T has cut costs on these circuits by building local loops only up to the capabilities required for the home telephone user. This level falls short of the requirements of data and other private-line users, Taylor implied.

The specialized carriers in many cases are using solid-state equipment that improves performance and allows adjustments at the customer premises to make up for deficiencies in the facilities provided by the phone company, he said. But despite "some violent screaming by some of the specialized common carriers, the Bell rate for local loop facilities to us is considerably below what we could do it for ourselves," the SP Communications official said.

When a customer requires high-speed data for his application, the microwave technology is a must. Bell's local loop plant is just not up to the battle and their T1 carrier system usually compounds the problem, Taylor said.

To solve these problems a new type of carrier called the "city common carrier" may be formed, Taylor speculated, but before this can happen the specialized common carriers will have to be successful enough to become the customers of such new local loop suppliers. One step that can help this situation is for users to sign five-year contracts with their specialized carriers.

Also, the specialized carriers in a city should be interconnected so that no matter which one the user selects, a common local loop would be available, he suggested.

One currently available alternative to local loops is rooftop microwave facilities and SP Communications is equipped to handle such requests under "special arrangement tariffs" in about six months from the day that an order is received. Most of the other carriers would also provide this type of transmission facility to users, but the current cost is about $2,000- to $4,000/mo and almost all carriers would want to have a five-year commitment from the customer, he added.

Customer rooftop to satellite is also available but costs run much higher, he said. A receive-only station would cost about $100,000 while a transmitting station would cost between $200,000 and $400,000, he estimated.

On a more practical level, today's specialized carrier systems provide users with 100% "hot standby" versus "one per five or one per 10 redundancy within the Bell System." Also, space diversity antennas used by the specialized carriers provide protection from fading and unwanted interference which results in an availability of service which is "three to four times" better than the Bell System, Taylor said.

Fault alarm capabilities have been improved in data modems and in error correction devices and Bell engineering for loops has "pushed the specialized carriers into four-wire service for all customers. These developments have greatly improved service to customers, he noted.

CW at TCA

Bell High/Low Tariff 'Just Piece of Paper'

SAN DIEGO, Calif. – Bell's high/low density tariff for private lines is a "paperwork billing tariff only," Ian Seidler of International Communications Corp. claimed at a TCA session describing current tariff problems for data communications users.

No new physical facilities are included, he said, although the customer lines should be upgraded from two-wire to four-wire capability at no cost, as provided for under the tariff.

Seidler noted that AT&T will help users reconfigure their nets, but the ultimate responsibility for getting the lowest cost routing under the high/low density tariff rests with the user.

One user at the session said the telephone company has reconfigured his network with the conclusion that he would have to pay $1,800/mo more to reach the same cities. After doing his own route analysis, the user said he found there was actually a savings of $2,000/mo under the new tariff.

Explaining that each low density site (as defined by AT&T) had to be routed through a specified homing center, Seidler told session attendees that it is possible for a large network user to create a homing center by having "a broom closet or business card office" in a certain locality.

One drawback of this approach is that the new office will be subject to a tariff drop charge and in some states this may require the user to pay local business taxes, he cautioned.

Cut keystrokes by what happens to

CORPORATE OFFICES: Ann Arbor, Michigan 48104 (313) 971-0900. DISTRICT SALES OFFICES: Atlanta (404) 457-1166 • Boston (617) 890-7290 • Chicago (312) 297-5200 • Cleveland (216) 831-8625 • Columbus (614) 888-8657 • Dallas (214) 521-6710 • Denver (303) 458-0794 • Detroit (313) 355-5770 • Greensboro, N.C. (919) 274-2964 • Hartford (203) 529-1100 • Houston (713) 688-5224 • Indianapolis (317) 784-6779 • Kansas City, Mo. (816) 842-7799 • Los Angeles (213) 640-0120 • Miami (305) 592-1533 • Milwaukee (414) 257-3780 • Minneapolis (612) 854-2309 • New York (212) 371-9050 • Philadelphia (609) 665-1170 • Pittsburgh (412) 922-3350 • Portland, Ore. (503) 227-5672 • San Francisco (415) 349-6626 • St. Louis (314) 878-0090 • Washington (703) 527-0200. SERVICE CENTERS IN 80 CITIES. CANADA: Sycor International Ltd., Toronto (416) 429-0883.

Realtors Pair Homes With Buyers Through CRT Net

By Patrick Ward
Of the CW Staff

GLEN ELLYN, Ill. – Member realtors of the Elmhurst, Ill., Multiple Listing Service have begun installing on-line CRTs in their offices to update files and match listings with their clients' needs.

The Elmhurst realtors are the first customers for an on-line system developed by Rias, Inc. (realtor's instant access systems) here. The system is based on a 32K word Varian V73 computer configured to handle up to 50 asynchronous, dedicated lines and up to 150 CRTs operating at 1,800 bit/sec.

Since the service began in August, Rias has installed seven TEC 425 CRTs in realtors' offices. About 79 realtors currently receive hard-copy printouts from the system, but most of these will soon be using the CRTs, noted David W. McCutcheon, Rias vice-president, product development.

Rias is pairing the 1,920-character screen CRTs with Centronics Model 306 printers for hard-copy output. Timeplex Bell 202-equivalent modems link the terminal sites with the Rias central processor here.

Perfect Home

The realtor keys in his client's desires as to area, number of rooms, cost and so on from a fill-in format.

The minicomputer relays back possible choices stored on the IBM 2314-type disks, displaying up to eight abbreviated listings on the realtor's CRT screen. The realtor can then obtain a full screen display and printed copy of any particular listing.

If the system does not contain a property the client wants, the realtor can store the client's specifications for up to 90 days. When a realtor does enter a suitable listing, the system prints out the client's number and the property number in the original realtor's office.

Realtors pay $142/mo for use of the CRT, printer, modem and phone line, McCutcheon said. There is an additional 5 cent usage charge for some of the system's capabilities.

McCutcheon said Rias looked at a variety of minicomputers, including Digital Equipment and Data General models before choosing the Varian unit. Most of the systems were in the $80,000 to $120,000 price range, and price was not the deciding factor, McCutcheon said.

Rias chose the V73 because of its hardware and software communications capabilities and fast (660 nsec) cycle time.

A network control monitor gives the status of the entire network and allows the user to switch from malfunctioning terminals and to redirect traffic from the console while the system is operating.

These capabilities allowed Rias to get through data communications programming more quickly and set to work on applications software earlier, McCutcheon explained.

The computer's microprocessor-based front end (DCM or datacomm multiplexer) permitted Rias to handle a greater number of lines and terminals, he added.

The DCM, he explained, handles all character interrupts from the lines, assembles them into messages and only interrupts the main processor when the message is ready.

Rias plans for each line to handle no more than three terminals; this will help insure typical response times of under two seconds, he predicted.

The Rias vice-president said the system involved more than two years of development work and a software outlay of about $250,000.

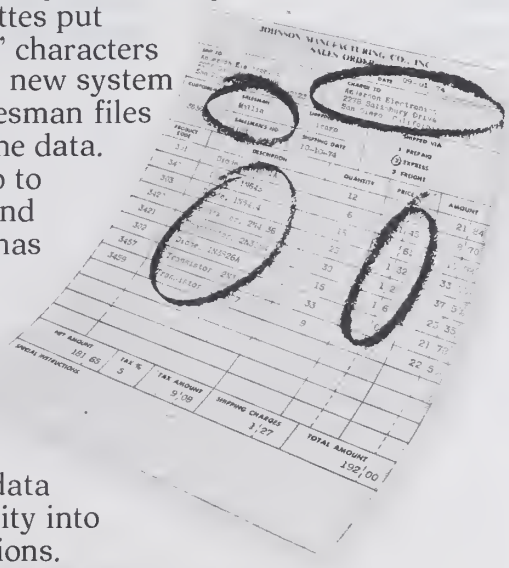
He estimated hardware costs for 50 fully equipped realtors' offices plus the central site at $350,000 to $400,000.

50% and guess data entry costs?

Costs are reduced and so are errors. Use of Sycor's 340 intelligent terminal with dual flexible disk in a typical order entry application can, in fact, reduce keystrokes by 50%.

And fewer keystrokes means greater throughput with fewer operators and a sharp reduction in error rates.

Our Model 340 with dual flexible disk may be used to automatically retrieve data from a file that an operator would normally have to key-in. These two IBM-compatible diskettes put 500,000 "fill-in-the-blanks" characters at your operator's fingertips. This new system allows you to store customer, product/price and salesman files right where you need them most—at the source of the data. And you can use it not only to retrieve data, but also to maintain and update files—even generate reports. And you can do it fast... because the Sycor flexible disk has the fastest access time in the business.



Hard disk, too. For larger file applications, our Model 340 with its new hard disk drive performs all the functions of the dual flexible disk system, but with a capacity of 2½ million characters. All of which can extend your remote data base management capability into new cost-saving applications.

From the people who brought you intelligence. This new concept of remote data base management wouldn't be possible without the intelligence of our Model 340 and its powerful TAL programming language.

The Sycor 340 and its wide variety of peripherals is part of the family of intelligent terminals that have made us the leader in the field. For more information, contact your nearby Sycor representative. He's got all the answers for reducing your data entry costs.

SYCOR

EIA Signals Made Bipolar

DANBURY, Conn. – Short range data sets developed by Data-Control Systems, Inc. are designed to convert unbalanced EIA data signals to balanced bipolar signals for transmission. The data sets should transmit signals at 2,400 bit/sec over distances of up to 10 miles, the company said.

The data sets are available in two models: the SR-200, which operates synchronously at switch-selectable speeds of 2,400-, 4,800- and 9,600 bit/sec; and the SR-100, which operates asynchronously at speeds to 1 Mbit/sec.

Both models will operate full-duplex, half-duplex and simplex over standard twisted pair balanced telephone cable, according to the firm.

Priced at $500 and $300 respectively, the SR-200 and SR-100 can be obtained in 60 days through P.O. Box 584, 06810.

Video Display System Includes Edit Channel

DUARTE, Calif. – The Intelligent Video Information Display System (Ivids) from the Datex Division of Conrac Corp. has four channels of alphanumeric video display and includes an edit channel.

With the exception of the keyboard and display monitors, the entire system is housed in an LSI minicomputer chassis, the company said.

Pages of data composed and edited with the keyboard and edit channel or prestored in extended memory may be displayed on any display channel.

Because all logical and editing functions are performed in the mini under software control, the firm claimed the system is reprogrammable and expandable to meet special application requirements.

Available either as a stand-alone display system or as a display subsystem to a larger system, Ivids carries various options, including up to 100 channels of video display, special-purpose data manipulation through software control, real-time clock display and floppy disk extended storage.

The display system sells for $10,000 and can be obtained from the company at 1600 S. Mountain Ave., 91010.

Overkill?

NEW YORK – John D. deButts, chairman of the board of AT&T, believes strongly in the corporate executive involving himself in community affairs. And he backs up his beliefs with actions, such as serving this year as chairman of the industrial division of the U.S. Savings Bond campaign.

But sometimes even deButts gets carried away. Recently he got a new executive assistant.

The name?

Miss E. Bond.

Progress Report:

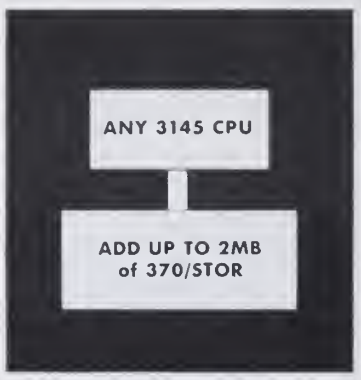
370/STOR 145

IT'S THE THINGS THAT ARE DIFFERENT THAT MAKE THIS MEMORY SO SUCCESSFUL.

370/STOR 145 is an expansion memory for IBM 3145 processors. In less than a year, it has become the dominant product in its market. Why? For one thing, security. Model 3145 users know Cambridge is the only independent supplier that designs, manufactures, sells and services the systems we install. For another, performance. 370/STOR 145 is different from any other 3145 add-on memory; and it is these differences that make it attractive.
For example:

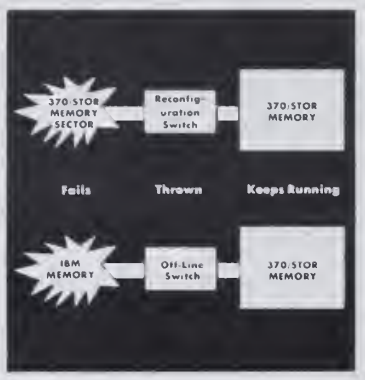
NO FLOPPY DISK MODIFICATION

A user can add 370/STOR 145 memory, in any size increment, without tampering with the console file. No patch decks are required, ever. So what happens on your "floppy disk" is between you and IBM. Cambridge doesn't get involved.



NO CPU ALTERATION

370/STOR 145 installs directly to your 3145 processor. No wiring changes. No model changes when you expand memory beyond your current model's capacity. That means Cambridge can increase your model 3145 memory to a full two megabyte capacity without any CPU alteration.



UNIQUE MEMORY PROTECTION

370/STOR 145 detects and corrects all single-bit errors, and detects multi-bit errors. So do other 145 memories. So to be different we add a reconfiguration switch to let you dial out failed 370/STOR memory, *plus* an off-line switch to dial out failed IBM memory. Either way, you keep running.

HIGHEST MEMORY ADDRESSING

Even IBM must change address lines when you add its memory. But not Cambridge. 370/STOR 145 is directly addressable up to 2048K without any change. It floats on top of any IBM address level. That's the secret of our modular expansion, lack of CPU alteration, and freedom from console file tampering.

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Mini World

Printer/Plotter Interfaces With DEC PDP-8 and 11 Minis

BERKELEY, Calif. – Data Systems Design's asynchronous printer/plotter interfaces with Digital Equipment Corp.'s PDP-8 and PDP-11 minicomputers.

The Model 120 printer/plotter is capable of operating under interrupts, with all status bits available to the software, the company said.

In its standard configuration, the 120 has upper and lower case, a full 96-character set, two-color ribbon or carbon cartridge and forward and reverse overprint capability.

Printing speed averages 30 char./sec with an optional 45 char./sec speed available. Feed methods include both tractor and pin for paper up to 15-in. wide.

The 120 is priced at $3,900 from the firm at 1122 University Ave., 94702.

Industry Standard Formatter Mounts Inside Tape Drive Cabinet

IRVINE, Calif. – Microdata Corp.'s Model 6920 tape drive fomatter mounts directly inside tape drive cabinets.

Contained on a single board, the formatter records and reads NRZI IBM-compatible 1/2-in. 9-track tapes with speeds from 12.5- to 45 in./sec at 800 bit/in.

The formatter is said to serve as a direct replacement of any industry standard formatter and is compatible with the Microdata Series 6000 and 6800 drives.

The formatter is priced under $700 from the firm at 17481 Red Hill Ave., 92705.

L Series Punched Tape Reader Has Speeds Up to 200 Char./Sec

NATICK, Mass. – The L Series punched tape reader offered by Control Logic, Inc. reads 5-, 6-, 7- or 8-level paper and paper-polyester or metallized polyester tape, fanfold or rolled, at speeds up to 200 char./sec.

Electronics are included for interfacing to the company's L Series minicomputers.

The unit requires no additional logic card space in the L Series LDS, CGL or CFL enclosures and frames. Electronics allow operation with or without interrupts, the firm said.

The unit, designed with a read head enclosed by a hinged cover and phototransistors facing downward is said to prevent reading errors from external light sources and protect the head from dust and dirt.

Single unit price is $895 from the company at Nine Tech Circle, 01760.

In Datapro Survey

Users Dub DEC Highest in 'Satisfaction'

By Vic Farmer
Of the CW Staff

DELRAN, N.J. – Digital Equipment Corp. (DEC) picked up "overall satisfaction" laurels in a recent Datapro Research Corp. survey of general-purpose computer users.

Based on responses from 752 users with a total of 1,288 installed computer systems, the 10 Decsystem-10 users rated the mainframe/manufacturer most highly in overall satisfaction as well as reliability of mainframe, reliability of peripherals, effectiveness of maintenance service and technical support.

Eight of the users had purchased DEC systems.

DEC also tied for first place with Burroughs in "ease of operation" and with NCR in the area of responsiveness of maintenance service.

Burroughs ranked highest in both operating systems and compilers and NCR rated best in ease of conversion.

Applications programs were a sore point with most users, but IBM, NCR and Xerox tied for first place.

In tabulating the results, Datapro found "a resounding 90% of the computer users supplied a good or excellent rating for overall satisfaction with their currently installed computer systems."

But comparable expressions of goodwill on the part of the respondents appeared only in two other categories: ease of operation and reliability of mainframe.

Users were somewhat unimpressed with mainframers' applications programs and quality of technical support.

Datapro ranked the systems in 11 performance categories and applied weighted averages and averages in coming up with the results.

The overall satisfaction ratings' weighted averages by users of the nine major computer makers were: DEC, 3.7; Burroughs, 3.3; Xerox, 3.3; IBM, 3.1; NCR, 3.1; Univac, 3.1; Honeywell, 2.9; Control Data Corp. (CDC), 2.8; and Singer, 2.8 on a scale of 4.

Some of the statistical characteristics of the Datapro respondents indicated:

- Over 50% of DEC, Xerox and CDC users had purchased mainframes.
- Honeywell, Burroughs, Univac, NCR and IBM users were primarily business applications users.
- NCR and Xerox users depended the most on manufacturer-supplied applications packages while Burroughs and IBM users used outside packages most.
- The Decsystem-10 users were the heaviest users of interactive terminals, and CDC users were the heaviest users of remote batch terminals.

Mini Update

Datapro has also updated its "All About Minicomputers" feature report. One section of the minicomputer feature report is a tabulation of data from 213 users with a total of 633 installed minicomputers.

Datapro did not break out comparison averages of overall satisfaction by manufacturer in this report, but it did provide indications of users' feelings in several areas.

"It is clear that minicomputer users are generally well pleased with the reliability and effectiveness of their hardware and reasonably well satisfied with the quality of the maintenance service they are receiving," the report said.

In the areas of associated technical support and software applications, however, Datapro summed up the negative feeling of the respondents by saying, "There appears to be more than a grain of truth in the provocative advertising claim that 'most minicomputers aren't delivered, they're abandoned.'"

The minicomputer users polled indicated that most systems used memory ranging from 8K to 24K, and over 80% depended on in-house personnel for applications programs.

Other specific characteristics of the minicomputer users surveyed revealed: 26% use minis for data communications functions such as remote job entry, message switching and front-end processing while about 19% used minis for business DP and data entry applications.

In addition to the survey results, the mini report has 34 pages of comparison charts describing the data formats, processing facilities, peripheral equipment, software pricing and availability status of 167 minicomputers available today.

Both reports cost $10 each from the firm at 1805 Underwood Blvd., 08705.

Memorex Controller Provides Direct Drive Attachment to 370s

SANTA CLARA, Calif. – Memorex Corp. has begun offering direct attachment of its 3670 (100M-byte) and 3675 (200M-byte) disk drive modules to the Integrated Storage Control (ISC) unit of IBM 370/145s, 158s and 168s. The drives are attached through a Memorex 3673 controller.

Memorex also said it has developed a 3- and 4-channel string-switch capability for the 3673 controller.

With the string-switch feature, users can reconfigure dynamically to balance controller loads for better systems efficiency or bypass a controller which requires servicing, reducing the total number of controllers required for a given level of computer availability, a Memorex spokesman said.

A 3673 controller and its "string" of up to eight 100M-byte and/or 200M-byte drives, for example, can be attached to four different Integrated File Adapter (IFA) or ISC controllers and/or Memorex 3672 storage control units, the company said.

Strings of 3670/3675 drives may be shared with strings of IBM 3330/3340 drives on separate parts of the same IFA or ISC, the company added. Switching of the 3673 string can be accomplished manually or under program control.

Memorex has also introduced a feature for its 3672 storage control unit which doubles the drive attachment capacity from 16 to 32 drives.

Correction

Computerworld's seminar on key-to-disk data entry systems, cosponsored by Management Information Corp., will be held Nov. 11-13 in New York City.

For additional information, contact CW at 797 Washington St., Newton, Mass. 02160.

Interface Expands Calculator

BEAVERTON, Ore. – The memory limits of Tektronix, Inc.'s Model 31 programmable calculator can now be expanded to over 500 times its standard capacity with the use of an interface which links the calculator to Tektronix flexible disks, according to the vendor.

The calculator flexible disk interface allows the Tektronix 4921 or 4922 flexible disks to provide mass memory, dedicated either to data storage or programs or both.

The 4921 single disk expands the memory capacity to 256 times the standard capacity and the 4922 dual disk doubles that capacity.

Two different types of write protect can be utilized for securing the information on the flexible disk. One, a tab which is inserted manually on the disk envelope, protects the entire disk; the other protects tracks 0 through 9 from erasure while allowing the remainder to be available for normal read-write operation.

The price of the interface, which will be available in November, is $300. Tektronix can be reached through P.O. Box 500, 97005.

HELP!
WE NEED A 168!
WE HAVE AN URGENT NEED TO INSTALL A 168 ON OR BEFORE DEC. 27TH.
• WILL BUY OR EXCHANGE DELIVERY DATES.
Reply to: CW Box 4205, 797 Washington St., Newton, Mass. 02160

Recurring Computer Nightmare #10

The day the IRS closed in on Reggie Van Cabot III.

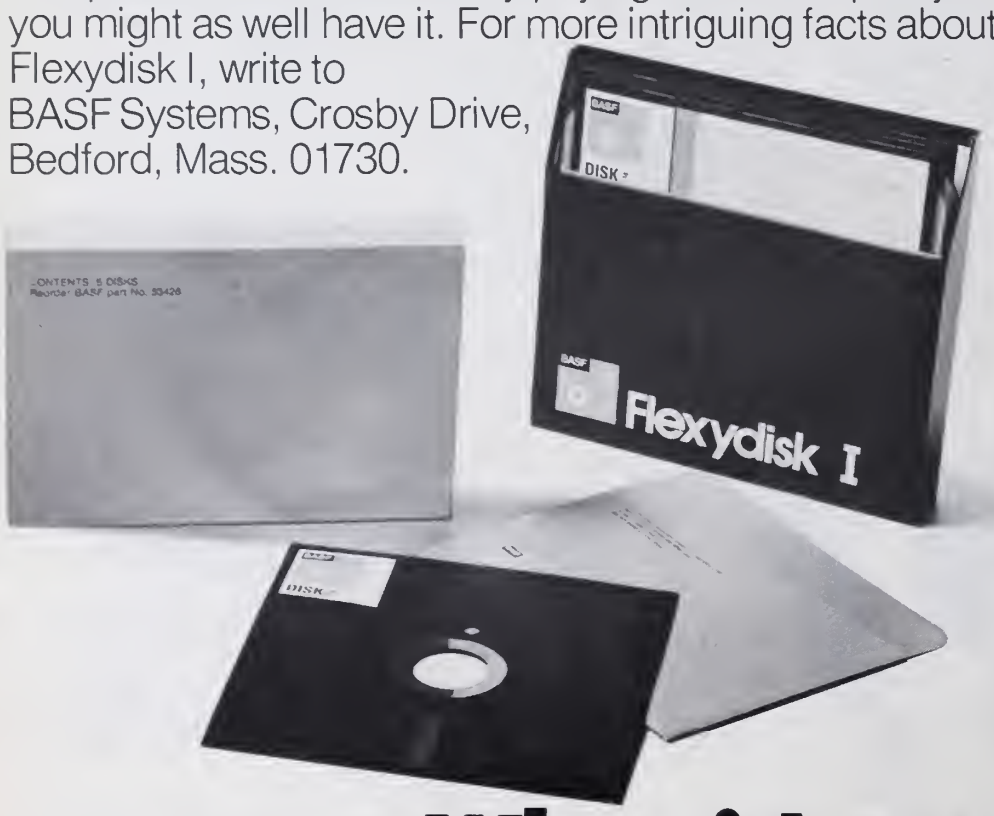
Maybe the auditing department was having a bad day or there was a thumbprint on the disk surface. But let's face it... just one tiny computer error could give you a bum steer.

What you need is a way to cut your possibility of error to a minimum. And the best time to start is the next time you order flexible disks. Just specify the BASF Flexydisk I.

We make our Flexydisks a lot better than they have to be. Each one is 100% certified, and pre-formatted for immediate use. Flexydisks have a clean, debris-free surface like our premium 2000/A.D. computer tape. A special dual-purpose coating gives increased disk and head life. Our tests have shown head wear to be less than 23.5 micro-inches in 92 hours of head-loaded operation.

To keep time and use from taking their toll, we protect our Flexydisks in a special self-cleaning jacket and liner. This little packaging extra cuts down on friction and the possibility of errors.

One more point. Flexydisks cost no more than the competition's. You're already paying for BASF quality... you might as well have it. For more intriguing facts about Flexydisk I, write to
BASF Systems, Crosby Drive,
Bedford, Mass. 01730.



When it's BASF...you know it's

not the disk that goofed.

The Prime Computer User Plan For Low Cost Time Sharing:

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Plan on a Prime multilingual time sharing system
One that supports up to 16 terminals; lets you program in BASIC, FORTRAN and Assembly Language; provides 128K bytes of protected virtual memory for each user; and can save you $40,000 compared to multilanguage systems from other manufacturers. (In fact, a Prime multilanguage system will save you money compared to most single-language time shared systems as well.)

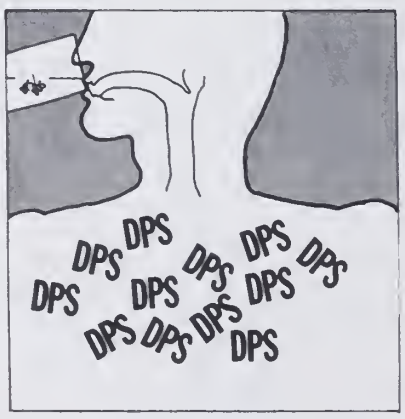
Plan on attending a Try-It-Before-You-Buy-It seminar
Find out how a Prime time shared system can fit your requirements. If you like what you see, we can deliver the system of your choice in less than 60 days.

Here's the seminar schedule; call us today and make a reservation to attend.

Boston	October 7	call (617) 879-2960
Philadelphia	October 9	call (215) 688-0396
Los Angeles	October 14	call (213) 881-8433
Detroit	October 16	call (313) 356-4840

PRIME COMPUTER INC 145 Pennsylvania Avenue / Framingham, MA 01701

Get Model 20 language out of your system.



Dearborn DPS/DOS™ software has converted over 2,000 programs from Model 20 language into a DOS system.

And, with a record of totally automatic conversions over 99 percent!

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Mini's Use in Retailing 'Ideal' Despite Industry's Resistance

By Nancy French
Of the CW Staff

NEW YORK – While the technology involved in equipment now featured for retailing applications is hardly new, the traditional nature of the retailing industry has made it resistant to change, according to Leonard Farano, executive vice-president of Gambit Management Strategies, Inc.

"The retail business is like a body," he said at a recent meeting here. "One leg is POS, the other is point-of-receipt. Everything else is in the body, and the information system is in the head.

"When too much emphasis is placed on POS at the expense of point-of-receipt, the body begins to topple."

The minicomputer is ideally suited for retailing applications because it is "relatively inexpensive, easier to manage by ordinary people, has low overhead, has few environmental limitations, is perfect for dedicated applications and, most important, has tremendous on-line potential," he said.

"Wouldn't it be great," he asked, "if a POS terminal ringing up the sale for a man's shirt could coordinate the fact that in haberdashery they're having a sale on ties and print out a message to the clerk to tell the customer about it?

"These systems have that capability right now," he said.

Other retail applications for minis cited by Farano included use as POS concentrators, credit authorizers, in-store reporting, import processing, merchandise control, big ticket control and accounts payable.

"The most pregnant application in retailing today," he continued, "is purchase order management.

"Order entry/creation, receiving, checking, marking, distribution, invoice entry and order check and order status, for example, are ideal mini applications," he said.

For every job, a suitable minicomputer exists, Farano said.

In selecting a mini, Farano suggested the following steps:

First, make a statement of the "decision situation – the problem you want to correct," he explained.

Then "set your objectives. Must you have it? Or would it just be nice?

"Generate the alternatives and then evaluate the objectives versus the alternatives.

"Consider the adverse consequences of each feasible alternative and then make the decision," he advised.

Higher POS Standards Recommended by ABA

WASHINGTON, D.C. – The Bank Card Standards Committee of the American Bankers Association (ABA) has recommended a higher degree of sophistication in ABA on-line, point-of-sale (POS) standards for the magnetic stripe to permit compatible off-line usage of credit and debit cards.

The present ABA Track 2 would be enhanced with a dependent Track 3 to support off-line usage with information to update where needed.

"The ABA position permits all ABA Track 2, nonupdate bank cards to intermingle with 'Track 2/3' bank cards without rendering obsolete investments already made in magnetic stripe-reading terminals, encoding devices and present card inventory," the committee reported.

Perry E. Hudson Jr., committee chairman and vice-president of Chase Manhattan Bank, said the proposal would satisfy the following essential criteria:

- Comprehensive standard to support all on-line and off-line applications for debit and credit cards.
- Full compatibility with cards currently in use which conform to existing ABA standards.
- Protection of the integrity of Tracks 1 and 2.
- No reencoding in terminals of critical data elements used on-line or off-line.
- Improvement of security.
- Maximum reading reliability.

"Evaluation of all other known approaches by a standards subcommittee," Hudson said, "found that none would satisfy these criteria." This includes the savings banks' Mints card standards, contained in the International Standards Organization (ISO) document N34.

Hudson said that the committee concluded N34 "lacked the essential objective of compatibility and would restrict the ability of bank debit cards to function in an intermingled environment with bank credit cards."

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Lower Costs Aiding Trend

Process Control Becoming 'Distributed'

By Dwight Johnson
Special to Computerworld

Process control, like data processing, is rapidly maturing into a distributed system architecture. Both current mainframe design and lower costs at the remote site are encouraging the trend.

Hierarchies of five levels of computing power in a communicative system are not uncommon. Many of these systems are outgrowths of single IBM 1800 configurations that simply outran the hardware available in one mainframe, and users have generally elected to expand the configuration by adding a subservient CPU to take over some of the chores of the original computer.

These additional requirements often interject a level that becomes devoted to communications between the levels, thus adding two levels to the original configuration.

Only recently have serious attempts been made to link the data acquisition capabilitites of the process computers and the classical data bases of data processing. These links typically consist of synchronous data channels, often using communications protocol.

Several architectures now also have direct channel attachments, where the process control computer is attached to a high-speed channel on the data processing computer and is read from and written to as a card reader/punch. The interface is quite easy from the interrupt-driven process machine, but considerable problems in software may be encountered if the data processing machine's physical and logical input-output control expects fixed-length records.

A terminology conflict exists between the data processing definition and the process control definition of "real time." Normally, for data processing, the last time that an inventory quantity changed status or moved between work centers is regarded as real time.

In process control, on the other hand, real time may be the period required for the system to detect the least measurable increment under control. This is usually measured in microseconds in positional and numerical control work.

In complementary data processing process control systems, the user must resist the temptation to pass too much data from the process control computer to the data processing CPU. "Snapshots" every three to ten minutes will quite often suffice to make the system "real."

Successful implementation of a computer-controlled process can be accomplished in a number of ways, but certain characteristics seem to prevail. The person responsible for the process must assume responsibility for the system at its inception. He must also have the support of all company divisions.

It is probably easier to train good DP programmers to program process CPUs than it is to retrain good process engineers to be programmers. It may well be a difference in the approach taken by these two different disciplines. It is the author's personal opinion the process engineer will contribute more to the overall project if he is allowed to express control schemes in his classical ladder diagram form. This has carryover advantages because these documents become part of the wiring scheme for the electricians and systems documentation for the programmer.

The next few years will undoubtedly see microprocessors, register transfer modules and sapphire-on-silicon (SOS) large-scale integrated circuits develop into true direct digital control (DDC) systems.

Standardization of interfaces will simplify installation. Eight-bit Ascii code is becoming standard, although there are many 6-bit-12-bit machines still in use.

Fortran is available on most of the larger minis and the number of cross assemblers is growing rapidly.

Dwight Johnson is production systems supervisor, Glass Information Systems, PPG Industries, Inc.

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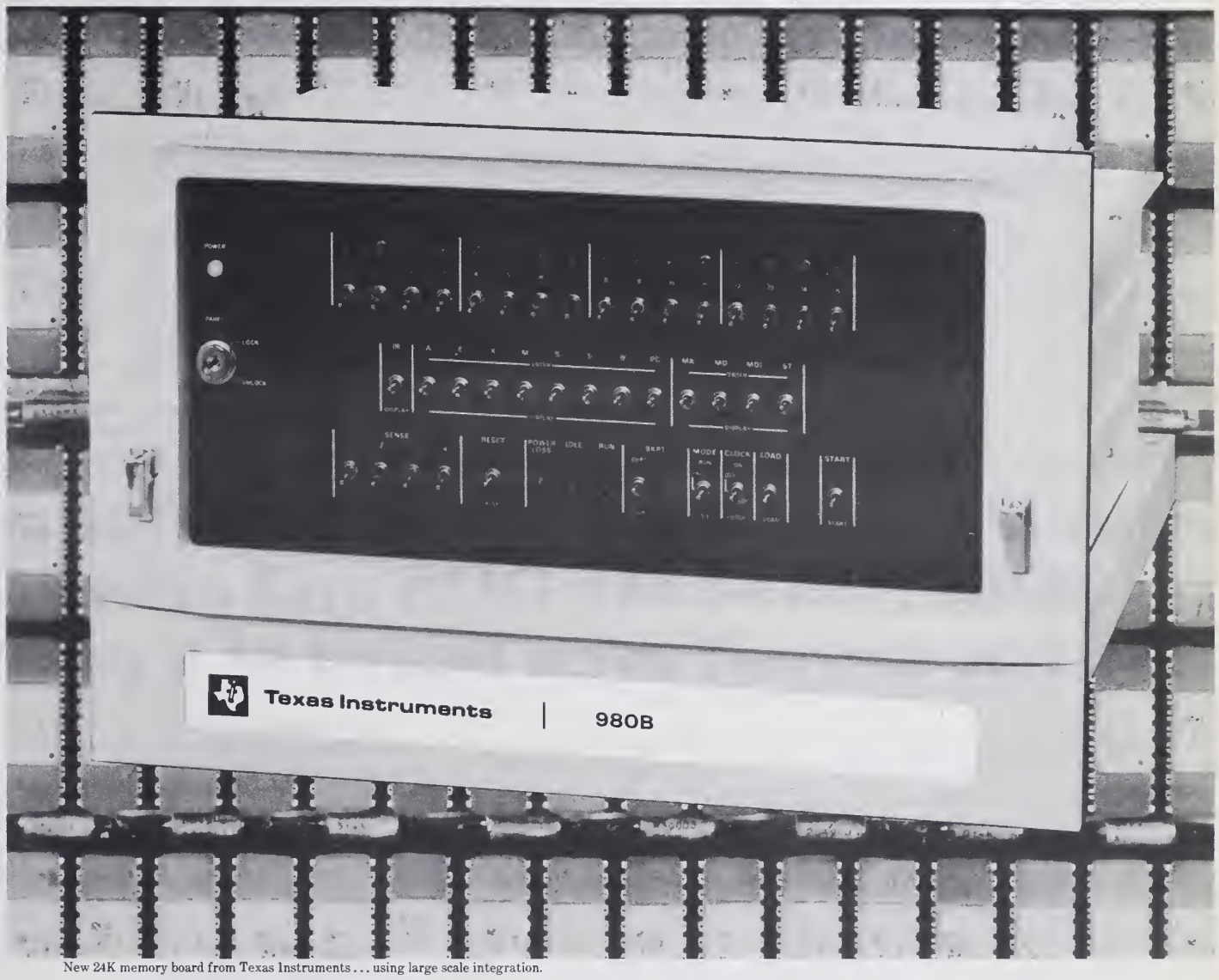

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Most Systems 'Defensive'

Merchandising Mechanization Ignores Profit

NEW YORK – "Is it profitable?" is the only question that limits mechanization of merchandizing management, session attendees were told at a recent conference.

"Most merchandising mechanization efforts lack this single most important ingredient – 'profit orientation,' " said Mark Trozzi of Cresap, McCormick and Paget, Inc. "Most systems can be categorized as defensive systems."

What is required, he said, are systems to measure action against plans, and the concepts of these systems must support the merchandising objectives of the store.

Trozzi noted three common problems in retailing:

- Adequate methods and standards have not been developed for classifying stores; assortments, therefore, cannot be tailored precisely enough to a store's needs or to its ability to stock and display merchandise.
- The way assortments are chosen too often ignores the judgment or knowledge of headquarters and store personnel, he said.
- Inventory management systems are frequently based on unsound plans and planning segments often aren't coordinated with organizational responsibility. Thus, inventories can't be controlled effectively.
- The size and complexity of business is growing and, although gross margins are fairly stable, the cost of doing business is rising too, Trozzi said.

More effective inventory management is a must to maintain or improve profits, he added.

Tools Need Sharpening

"These pressures point up the need for sharpening the merchandise management tools required to improve sales and profits," he said.

"Foremost among these tools are techniques for classifying stores, determining assortments and managing inventory."

Stores should be classified neither by total sales volume, physical size nor on the basis of departmental sales or purchases, Trozzi remarked. For automation, classification should be made by merchandise category.

In keeping with this idea, he said, the assortment for the smallest classification should represent the minimum assortment that management feels will be acceptable.

"The number of classifications should be limited so the differences among them are clear," he noted. "Probably no more than six or eight classifications should be considered under normal conditions."

In this system, the sales or retail purchases in a department or merchandise category should be used to determine the adequacy of the selling space assigned.

Determining Assortments

In determining assortments appropriately, the person in charge of overall assortment planning must be fully informed of local problems in the field, be able to identify geographic differences which require variations in stocking and must have access to unit and dollar sales information so he can make specific item recommendations for each assortment class.

Seasonal planning by month of sales, inventories and purchases in each department, store and warehouse should be part of any inventory management scheme, he said.

"Open-to-buy dollar allowances" must be developed for the use of each executive responsible for purchasing merchandise; all purchasing actions should "be recorded against plans in a meaningful way," he added.

"It is neither practical nor possible to install these systems in all departments at one time, because there are substantial training requirements," Trozzi noted.

"However, it is perfectly practical to undertake installation on a department-by-department basis over a period of one or more years."

Minneapolis to Minimize Carbon Monoxides

MINNEAPOLIS – A computerized traffic signal system designed to reduce carbon monoxide pollution by minimizing stops and traffic snarls is scheduled to begin operating here next June. Within 2-1/2 to three years, 644 of the city's 700 traffic signals will be connected to the system, at an estimated cost of $5 million.

Installation was proposed by the Minnesota Pollution Control Agency as one way to reduce carbon monoxide pollution in downtown Minneapolis to meet federal standards by 1975.

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Common On-Line Data Base Spurs 'Spar' to Success

By Saul H. Topolsky
Special to Computerworld

ALLENTOWN, Pa. – The purchasing, receiving and accounts payable organizations in most manufacturing firms may appear to be unrelated, but actually they share a common thread of activity and utilize much of the same common data.

Why then not capitalize on these circumstances and develop an integrated purchasing information system that builds upon the data furnished by the purchasing organization and makes use of this data in the receiving organization. In addition, the accounts payable organization can use many of the same data elements accumulated by the other two groups and thereby complete the cycle.

Western Electric Co. is now in the development stage for an on-line system of this type at the Allentown Works. Other Western Electric sites have already implemented systems of this type. This one is called Spar, for Supplier-Purchasing, Accounts Payable and Receiving.

An On-Line System

A local information system development philosophy dictates that as the scope, bounds and objectives of each new system are examined, it must be determined whether the new system is a candidate for real-time or on-line applications. This determination is made largely on the likelihood of other systems making use of the data gathered or generated by this system.

The Spar system met the on-line requirements test with flying colors and, therefore, the decision was made to design and develop the entire system on a on-line basis in stages to blend it with other existing or modified systems.

The Spar data base has been designed with five major files: open purchase order, vendor and/or supplier, daily receivals, invoices to be paid and daily transactions. By utilizing Cincom's Total, a software data manager, the linkages between these files are such that data from any file can easily be accessed for the purpose of outputting data to a CRT terminal.

When a material requisition enters the purchasing organization, an order clerk can query the on-line system data base to determine if this material was ever ordered before. If it was a previously purchased item, then it can also be determined who the supplier was and if there are any orders currently open.

If it is a new item, never previously ordered, then a vendor must be selected. In any event, and at the very minimum, the quantity, vendor, purchase order number and required delivery date must be determined. When all of this is completed and entered into the Spar CRT terminal, the order is ready for mailing to the vendor.

Receiving Data

When the supplier ships the material to the plant he normally includes a packing slip and a bill of lading for large orders.

The clerk on the receiving dock gets the packing slip with the purchase order number and can input this data at a nearby terminal.

This input brings up a screen of the purchase order formatted for the receiving organization use.

Data concerning quantities, inspection procedures and plant forwarding locations would be furnished and in a matter of minutes the system could be updated with the information about receipt of the delivered material.

Very often an integrated purchasing system has a "dock to stock" system coupled with it. This system provides the data whereby the received material gets routed and physically moved to its final in-plant location in a most expeditious manner. If the material is to go to a storeroom, then data concerning the storeroom location is specified and, if they are known, the rack, location row, shelf and bin locations within the storeroom itself are noted.

Western Electric intends to couple this "dock to stock" feature into the Spar system once it becomes operational in the receiving area.

When the vendor sends his invoice for the furnished material, it normally goes to the accounting organization responsible for paying invoices and vouchers. The accounts payable group, upon receipt of an invoice, inquires of the Spar system concerning the status of the associated purchase order.

A check is made through the CRT terminal on the completeness and quality of the order. In fact, a query can be entered at any time to determine the up-to-date status of any purchase order. If the voucher clerk finds that the entire order is accounted for and that the delivery was accepted by the order source, then the bill is verified for payment.

In following the purchasing, receiving and accounts payable flow of data for one purchase order, it is easy to see how an on-line system is best suited to meet this need. However, as with all real-time systems, a full range of backup procedures must be prepared and maintained in case of hardware failure.

The Spar system provides the capability of accumulating on tape all add, delete or change transactions for a 24-hour period. As part of the daily system maintenance procedure this tape is read against what the Spar data base should show and all discrepancies are highlighted and corrected.

The company is now engaged in the process of converting existing batch files into a "Total"-oriented structure such that the receiving clerks will be able to call-up open purchase orders on their CRTs.

Purchasing will come next. This subsystem will massage material requisition data into a form necessary for output to the vendor and will provide most of the data for the open purchase order file.

The final group to be serviced will be accounts payable.

Saul H. Topolsky is department chief, Business Information Systems, Western Electric Co., Allentown, Pa.

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Evaluation Goes Hand in Hand With Installation of DP System

NEW YORK – "Control and evaluation should be part of every information system as it is installed," Dr. John F. Rockart, associate professor of management at MIT's Sloan School of Management, cautioned managers at a recent meeting here.

Recognizing that any measurement of the impact of DP on a company "will be imperfect," Rockart suggested evaluations can be improved by using a system of multiple measures which reflect the multiple aims of top management and systems people.

"There are all kinds of reasons why an evaluation of the effect of DP on a business can't be complete," he said.

"Changes in management disturb the continuity of projects under way, and measures of such variables as the quality of decision-making and increases in productivity are imprecise. Pressures exist to move onto the next job rather than to stop and examine the approach to the previous project, and there is a sense that the system will continue, regardless of any evaluation that takes place," he explained.

Who should evaluate a project carried out by the DP function? How can measures be devised to deal adequately with a changing technology? These are additional concerns for management and DP personnel in assessing their information systems, Rockart noted.

Suggesting that systems analysts and managers work together to evaluate DP, he contended that firm project objectives, rather than the uncertainty associated with current technology, should form the guidelines.

"Objectives should determine which measures will be used, and these should be predefined, should adhere to a baseline plan and should be evaluated at various points throughout the project," he said.

Once key variables have been identified, numerous techniques can be used to measure performance.

Among these are logging events associated with the project's development, surveying the attitudes of the DP people involved, rating and weighting user impressions of the project, measuring actual output in terms of what the project was designed to accomplish and evaluating the cost of the project based on the benefits it created, according to Rockart.

While concurring with the need to provide for evaluation when automating the information function in a firm, Dr. Richard Hespos, vice-president of computer applications for Dun & Bradstreet, Inc., stressed the importance of switching from a manual to an electronic system in small, well-defined stages.

"Don't try to automate all at once," he cautioned the managers, "and make both systems people and users strain and sweat to accomplish the task at hand."

He also emphasized the need for someone within the company to act as mediator between executives and systems people.

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BOSTON – A National Conference on Legal Aspects of Computer Use in Health Care Delivery is scheduled for Nov. 7 and 8 here.

Sponsored by the American Society of Law and Medicine and Blue Shield of Massachusetts, the conference will be held at the Sheraton-Boston Hotel.

Some of the topics to be discussed include: How Computers Relate to Health-Care Delivery, Common Information Processing Deficiencies in Health Care Delivery and Their "Legal" Consequences, Qualities of Computers That Minimize or Avoid Information Processing Deficiencies in Health-Care Delivery and Their "Legal" Advantages and An Action Program for More Effective Computerization of Health Care Delivery Systems.

Roy N. Freed is the conference chairman; vice-chairman is John A. Norris. Conference information is available from the American Society of Law and Medicine, 454 Brookline Ave., 02215.

Call for Papers

1975 SUMMER SIMULATION CONFERENCE, July 21-23, San Francisco.

Unpublished papers are requested on the conference theme — "Simulation Credibility Revisited" — including such areas as: validation of simulation models; languages and tools; and applications in physical, chemical, life, management and social sciences, and environment and energy.

A three- to five-page summary should be submitted before Dec. 1 to program chairman Dr. Stewart Schlesinger, The Aerospace Corp., P.O. Box 92957, Los Angeles, Calif. 90009.

Calendar

Oct. 16-18, West Lafayette, Ind. – **Machine Processing of Remotely Sensed Data.** Contact: Carl Jenks, Conference Coordinator, Stewart Center, Purdue University, 47907.

Oct. 16-18, Chicago – **1974 National Electronics Conference.** Contact: National Electronics Conference, Oak Brook Executive Plaza 1, 1301 W. 22nd St., Oak Brook, Ill. 60521.

Oct. 16-18, Montreal – **Ninth Annual Iomec Users Association Conference and Seminars.** Contact: Glenn Lutat, Executive Director, Iomec Users Association, 3300 Scott Blvd., Santa Clara, Calif. 95050.

Oct. 17-18, Las Vegas – **Accounting IV Meeting,** sponsored by Informatics, Inc. Computing Technology Company user group. Contact: Robert B. Steel, 21050 Vanowen St., Canoga Park, Calif. 91303.

Oct. 17-18, Washington, D.C. – **The Eastern Regional Operations & Automation Workshop,** sponsored by the American Bankers Association (ABA). Contact: Operations & Automation Division, ABA, 1120 Connecticut Ave., N.W. 20036.

Oct. 18-20, Monterey, Calif. – **Second National Conference on Automated Law Research,** sponsored by the American Bar Association's Standing Committee on Law and Technology. Contact: Economics Department, American Bar Association, 1155 East 60th St., Chicago, Ill. 60637.

Oct. 20-23, Seattle – **19th Annual Conference of the American Records Management Association,** "Records Management – Today & Tomorrow." Contact: Gerald L. Hegel, c/o The Upjohn Co., Unit 8015, Kalamazoo, Mich. 49001.

Oct. 21-22, New York – **First National Government Financial Systems and Money Management Conference,** sponsored by New York University. Contact: New York Management Center, 360 Lexington Ave., 10017.

Oct. 21-23, Boston – **'74 International Microelectrics Symposium.** Contact: T.B. Gillis, Program Chairman, ISHM, Raytheon Co., 465 Centre St., Quincy, Mass. 02169.

Oct. 23-25, New York – **41st Management Conference & Annual Meeting,** sponsored by the Association of Data Processing Service Organizations (Adapso). Contact: Adapso, 210 Summit Ave., Montvale, N.J. 07645.

Oct. 28-31, New York – **1974 Instrument Society of America (ISA) International Conference.** Contact: ISA/74 Conference, ISA, 400 Stanwix St., Pittsburgh, Pa. 15222.

Oct. 28-31, Boston – **Nerem '74,** with emphasis on display technology. Contact: Nerem Business Office, 31 Channing St., Newton, Mass. 02158.

Oct. 30-Nov. 1, San Diego, Calif. – **Automatic Support Systems Symposium for Advanced Maintainability.** Contact: Mike Forys, Registration, '74 ASSC, 8640 Somerset Ave., 92123.

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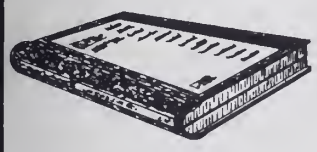

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FALL TRAINING SCHEDULE

STRUCTURED PROGRAMMING CONCEPTS – a 1-day survey of the philosophy and groundrules behind structured programming which offers a comprehensive overview of the developments, uses and achievements of structured programming. **FEE:** $100. **MATERIALS:** *Program Structure and Design* (prepublication) by Edward Yourdon. **INSTRUCTOR:** Edward Yourdon.

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10/9 Chicago
10/10 Cincinnati
10/11 Detroit
11/6 Altanta
11/7 Pittsburgh
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12/13 Miami

STRUCTURED PROGRAMMING WORKSHOP – a 5-day intensive workshop seminar offering lectures and practice periods to allow the student an opportunity to use the techniques described in the lecture sessions. **FEE:** $575. **MATERIALS:** *Program Structure and Design* (prepublication) by Edward Yourdon, and copies of 200 visuals. **INSTRUCTOR:** Edward Yourdon.

11/18-22 Washington, D.C.

ADVANCED PROGRAMMING TECHNIQUES – a 3-day seminar that gives the programmer a wide range of practical programming skills which he could not obtain in a "basic" training course; included in the seminar are discussions of optimization techniques, data structures, dynamic storage allocation techniques, decision tables and table lookup techniques. **FEE:** $375. **MATERIALS:** *Techniques of Programming* (prepublication) by Edward Yourdon, and copies of 450 visuals. **INSTRUCTOR:** John McGreachie

10/7-9 Chicago 12/16-18 Washington, D.C.

STRUCTURED DESIGN – a 3-day seminar that concentrates on the structure and relationship of modules in a large programmer system. It introduces the concepts of *binding* and *cohesiveness* as measures of the complexity of a program structure and as a means of designing simple, inexpensive and yet efficient system designs. **FEE:** $375. **MATERIALS:** Over 100 pages of notes by Larry Constantine **INSTRUCTOR:** Larry Constantine.

11/25-27 Los Angeles 12/4-6 Washington, D.C.

STRUCTURED PROGRAMMING TECHNIQUES – 3-day seminar offering a thorough grounding in all the basic techniques of *top-down design* and *structured programming* with some class exercises and homework problems. **FEE:** $375. **MATERIALS:** *Program Structure and Design* (prepublication) by Edward Yourdon, and copies of 200 visuals. **INSTRUCTORS:** Edward Yourdon and Robert Abbott.

10/7-9 Chicago 12/4-6 Denver 12/16-18 Washington, D.C.

TESTING, DEBUGGING AND MAINTENANCE – a 2-day seminar that offers a state-of-the-art collection of techniques and strategies for designing programs so that they can be tested more easily; for testing programs more effectively (e.g., with top-down testing and structured walkthroughs); for debugging programs more quickly and effectively; and for maintaining programs that may not have been developed with the most modern techniques. **FEE:** $250. **MATERIALS:** Notes prepared by Edward Yourdon and accompanying copies of visuals. **INSTRUCTOR:** Robert Abbott.

11/21-22 Washington, D.C.

DESIGNING ON-LINE COMPUTER SYSTEMS – a 3-day seminar that presents an intensive and unified discussion of the most critical elements of designing and implemeting real-time and on-line computer systems with today's 3rd and 4th generation computers. **FEE:** $375. **MATERIALS:** *Design of On-Line Computer Systems* by Edward Yourdon (Prentice-Hall, 1972), and copies of 300 visuals. **INSTRUCTOR:** John McGreachie.

11/18-20 Washington, D.C.

FOR DETAILS on these and future seminars, or for inhouse presentations of these topics, contact: Rikki Moss, YOURDON inc., 575 Madison Avenue, New York, New York 10022; (212) 486-1757

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CI Notes

IBM Sues Forro

SAN FRANCISCO – IBM has filed a $25 million counterclaim against Forro Precision, Inc. in response to a $36 million antitrust suit filed by the firm against IBM [CW, Aug. 28].

The IBM suit charges Forro with unlawful market presence and misappropriation of trade secrets and seeks $5 million in actual damages and exemplary punitive damages of $20 million.

The initial Forro complaint charged IBM with interrogating Forro employees, seizing "business records" and using pricing documents, copied during a July 1973 investigation of the Forro plant, to prevent the company from completing sales of components to a number of its customers.

IBM obtained Forro pricing information as part of its research into alleged thefts of disk drive trade secrets by former employees of its San Jose facility last year. IBM did not bring charges against Forro at that time, and no Forro employees were arrested in connection with the San Jose case, a Forro spokesman pointed out.

IBM's suit charges Forro with theft of trade secrets and confidential information, "the knowing and deliberate solicitation, purchase and acceptance of IBM trade secrets from industrial espionage rings and from other unlawful sources."

Computer Automation Cuts Force

IRVINE, Calif. – Computer Automation, Inc., maker of the Naked Mini, has laid off about 30 employees in an effort to reduce overhead. Additional layoffs are likely because of disappointing order rates, a spokesman said.

Results for the first quarter of fiscal 1975 might be lower than those of the prior year for the first time in three years, he added.

The firm has named Silverstar, Ltd., S.p.a. and Unitechnik as distributors for its products in Italy and Austria, respectively.

Supershorts

Interdata, Inc. has installed its Model 7132, which it claims is the first 32-bit minicomputer for under $10,000.

– – –

Hewlett-Packard Co. delivered its 3,000th magnetic disk drive, an HP-7900, to Camsco, Inc., where it will be incorporated into the Camsco Markamatic system.

– – –

Iomec, Inc. will supply cartridge disk systems to Basic Four for the next two years for use in small business minicomputer systems. The contract has a value of up to $4 million.

Sanders Seeks Earlier Release

IBM Specs 'Key to Independent Survival'

By Tom Geyer
Of the CW Staff

NASHUA, N.H. – The only effective standards-setting body within the computer industry is the systems architecture group within IBM, the general manager of Sanders Data Systems believes.

And Arthur Carroll would be willing to live with that situation – since all other standards efforts have been "colossal failures" – if IBM were compelled to publish its interface, data formatting and line discipline standards at the same time the IBM systems architecture group releases them internally.

"These standards are the key to the economic survival of independent manufacturers," said Carroll, who believes the independents have a vital contribution to make to the industry's progress.

"It seems to be impossible for the rest of the industry to set its own standards by committee – the only way is to lock some people in a room and not let them out until they agree," he said. "That's what IBM does, in effect."

Carroll rejected the idea of formal government regulation of the industry to enforce standards, calling that idea "against our way of life." But he thinks IBM could be compelled by pressure from users – including the government – to release its standards.

That will be one of the goals of the antitrust suit Sanders plans to file against IBM charging it with "anticompetitive" marketing practices.

Today IBM uses its control of standards to exclude competition, Carroll said, but he apparently feels IBM's *de facto* standards could actually be an asset to the industry.

The Federal Government can use its "clout" as a computer buyer to force mainframers to disclose interface standards by insisting on seeing full interface specifications before buying any mainframe, Carroll said.

"The government makes up specs and then goes out and buys IBM equipment that doesn't follow them," he charged.

In Carroll's view, the independents can make real contributions to the advancement of computing – but won't get the chance unless IBM is forced to let them in.

"Can IBM cover all the bases by itself?" he asked. "No. No one person or organization understands all the potential of DP. There's plenty of room for innovation.

"We don't want to compete with IBM on its strong points – you don't slam into the Maginot line, you go around it."

The problem of interfaces could have been licked by the Telex case, Carroll said, "if Telex had done its homework."

But Telex failed to convince the court that effective injunctive relief would have to require IBM to release interface specs whenever a new product is first released for manufacture, not merely when it is formally announced.

As it is, Carroll thinks IBM will continue to make entry into the market unfeasible for independents by effectively imposing "total systems" on users, playing with interfaces and rapidly obsoleting products.

Media Makers Assess Pricing Plans

By Nancy French
Of the CW Staff

NEWTON, Mass. – Memorex Corp.'s 90-day advance warning of "a new pricing policy" for magnetic products effective Jan. 1 not only puts users on notice, but also gives other manufacturers time to catch up, an industry spokesman predicted.

With this quarterly review policy, Memorex can appraise the competitive situation on a more current basis, thus avoiding setting arbitrarily high prices at the start of the year and trying to second-guess suppliers and their costs.

"Many of our suppliers are giving us price increases with as little as no notice, and all are talking in terms of as much as 30% increases in 1975 as compared with 74," Philippe Yaconelli of Memorex explained.

Raw Materials the Culprit

In a product like computer tape, where approximately 60% of the manufacturing cost is involved in raw materials, the profit margin is not sufficient to absorb a 30% price increase, and inflationary costs will have to be passed on to the customer, Yaconelli said.

Increasing shortages and higher prices of styrene material, polyesters, packaging and paper, combined with inflation of about 12%, leaves prices nowhere to go but up, according to Art Field, Graham Magnetics' national sales manager.

"I don't think prices will go up as much as 30%, but they are going to go up," he said.

Memorex to Review Prices Quarterly

SAN JOSE, Calif. – Memorex Corp. will initiate a new pricing philosophy for its magnetic products in 1975, due to the continued and unpredictable series of price increases in its raw materials for computer supplies, according to Philippe Yaconelli, vice-president of marketing, media products.

Under the new policy, costs will be examined at the start of each quarter, and prices will be adjusted accordingly "to most accurately reflect our true costs during the next three month period," Yaconelli explained.

Compared with Memorex's somewhat novel approach to increasing prices, BASF has adhered to traditional planning for the coming year.

John Healion, BASF marketing manager, computer products, said, "We're estimating what the increase in the raw materials and labor costs will be for the entire year at the present time," indicating no announcements would be forthcoming at the moment.

Reviewing costs and prices every 90 days is probably a good idea "in light of what happened last year", Healion remarked.

Implying that speculation about price increases only serves to fan inflation flames, 3M Company's Curt Koefod, marketing director, data recording products, said he was reluctant to make any predictions.

"I don't know what our costs are going to be in January or next July, and I would hate right now to say we're going to raise our prices in January. We don't know that," he explained.

Competition Still Flourishing

Despite increasing manufacturing costs, competition has still kept prices lower than one might expect, another vendor remarked.

Although tape sold in January for $10.50 a reel now sells for an average of $12 a reel, on orders of 200 reels or more deals are being made for as little as $8.75 a reel, he said.

Eleven-high disk packs that rented for $7 to $8 a month in January now command only $6.50 to $7.50 a month, he said.

Nashua, which sells tape but whose major business is disk packs, has been unable to maintain prices set last spring, according to David Wright, marketing manager.

Nashua has no formal plans for a similar hike in the foreseeable future, he said.

While price increases will be necessary, many manufacturers probably will not be able to keep them high enough to absorb all rising costs and will probably have to accept smaller profit margins – if they want to stay in the business, an industry observer said.

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And we're hungry. For the full story, call Mike Salter, Commercial Marketing Manager at Raytheon Service Company, 12 Second Avenue, Burlington, Mass. 01803. (617) 272-9300.

HP Restructures Into Six Product Groups

PALO ALTO, Calif. – Hewlett-Packard Co. (HP) has restructured its corporate organization by establishing a new management level of three executive vice-presidents responsible for operations and corporate administration and by realigning its four existing product groups into six groups.

New product groups include the computer systems, instruments and calculator groups as well as the original components, medical instruments and systems and chemical analysis instruments and systems groups.

The new structuring gives increased visibility to the computer operations as it combined the Automatic Measurement Division with the Data Systems Division and separated the calculator operations into its own group.

The Automatic Measurements Division marketed many products that were computer-based, and the consolidation move will result in a unified sales force, a spokesman said.

Two executive vice-presidents, Ralph E. Lee and John A. Young, share responsibility for the supervision of all product groups. Young will oversee the Computer Systems Group.

Robert L. Boniface, previously vice-president of marketing, has been named vice-president in charge of corporate administration. His successor is Alfred P. Oliverio, formerly marketing manager of the Electronics Products Group.

Paul C. Ely Jr., formerly general manager of the Data Systems Division, has been named general manager of the Computer Systems Group.

This group represents about $170 million in annual sales with more than 4,500 employees worldwide, according to Young.

The new organization will enable HP "to continue to grow within a structure suitable for the effective management of a larger and more complex operation," said President William R. Hewlett.

CSC's Network Revenues Reflect Growing Computer Services Market

NEW YORK – The market for computer services is currently growing faster than that for computer hardware and will continue to grow at this fast pace in the foreseeable future, William R. Hoover, chairman and president of Computer Sciences Corp. (CSC), told the Computer Industry Analysts Group here recently.

Heavy demand for computer services has not yet been affected by the negative factors present in the current economic environment, he said.

25% Rise Annually

One of the fastest growing industry segments is computer network services, according to Hoover, who pointed out that remote computing revenues are increasing at a rate of about 25% annually from a current base of approximately $700 million.

CSC's own data processing network is exceeding this growth rate, he said, with an increase of more than 45% expected for the first half of fiscal '75 over first half fiscal '74.

CSC's network, Infonet, is currently doing business at an annual rate in excess of $30 million, compared with revenues of $23 million in the last fiscal year.

Infonet's profitability has increased even more sharply, Hoover noted. Operating earnings of $1.2 million for the first quarter of the current year equaled those for the entire 12 months of CSC's last fiscal year, he said.

Contracts

Scan-Data Corp. Writes $3 Million Order for 2250/2

NORRISTOWN, Pa. – Scan-Data Corp. has received contracts valued at over $3 million for its Model 2250/2 key entry system.

Most of the business is from two customers, Automatic Data Processing, Inc. and Blue Cross/Blue Shield of Florida, Inc., each of which ordered more than 10 key entry systems.

Other Contracts

Acts Computing Corp. has received a contract from eight municipalities to provide a water billing service. Acts recently purchased Ford Motor Co.'s Water Billing Business.

Bergen Brunswig Corp.'s Health Applications Systems Division has been awarded a contract by the State of Florida to furnish DP, computer facilities and managmeent and systems support for the state's Medicaid prescription drug program.

Distronics Corp. has received a contract from State Wholesale Supply, Inc. to provide complete DP services.

Computer Sciences Corp. has been awarded a contract from the Navy Regional Procurement Office for programming support to the Fleet Combat Direction Systems Support Activity in San Diego.

General Telephone & Electronics Corp.'s GTE International, Inc. unit has received an $11.5 million contract to provide and install computer-controlled telephone switching equipment for Taiwan.

Logicon, Inc. has been awarded a contract by the Boeing Aerospace Co. to design a software test and evaluation system for use at Hill Air Force Base.

Burroughs Corp. has received a $5 million contract from the Federal Aviation Administration for 47 automated radar terminal systems.

Data Enterprises of the Northwest has won a contract to provide facilities management services on a long-term basis for the Loomis Corp., an armored car and courier service company.

Incoterm Corp. has received a contract valued at over $135,000 from WTC Air Freight Corp. for its SPD 10/20 intelligent computer terminal systems and SPD-100 printers for use in WTC's air freight dispatch and tracking system.

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Because companies want to save legal fees · or because they do not think they can find a lawyer who understands their industry · they often have non-legal technical people draft agreements. This is done both by suppliers and users in the computer industry, and the resulting agreements are used both for specific transactions and as "standard forms". In either case, there can be significant problems. It is easy to overlook important legal points, and the results of such omissions can often be very damaging.

That's why we're presenting this comprehensive one-day workshop on the drafting of effective legal agreements. Although it's impossible to give you full legal knowledge in a short course, we do plan to give you the basic skills necessary to write better legal agreements and to spot items that really require the attention of lawyers.

Our workshop leader is Roy N. Freed, the nationally recognized expert and author in the field of computer law, and leader of our comprehensive seminar "Contracting for Computers and EDP Support Services" Mr. Freed will conduct the workshop with a great deal of interaction among participants, and all participants will receive a complete workbook on the subject. Here are the topics to be covered:

Purposes and Functions of Formal Agreements

- Communication to those who will administer them for each of the parties.
- Scenarios to courts, tax collectors, and other important outsiders.

Variety of Formal Agreements

- Purchase and sale of goods or services.
- Letter agreements.
- Letters of intent.
- Purchase orders.
- Blanket order agreements.
- OEM agreements.

Architecture of Agreements

- Contents
- Formal structure.
- Internal relationships.
- External factors.

Language Caveats

- Legal terminology or legalisms.
- Technical terminology, jargon, or buzz words.

Use of Forms, Checklists, and Outlines

- Strengths.
- Dangers.

Suggested writing style

- Word choice.
- Sentence structure.
- Definitions.
- Body vs. schedules
- Cross references.
- Obligations vs. performance conditions.
- Drafting techniques.
- Common bad practices.
- Intentional ambiguities and uncertainties.

Sources of Applicable Legal Rules

- Statutes, such as the Uniform Commercial Code.
- Court decisions.
- Enforceable agreements between the parties.
- Practices of the party itself.
- Custom in the industry.

Significance of Particular Legal Factors

- Scope of work or services.
- Delivery.
- Price.
- Performance schedule.
- Acceptance.
- Warranties.
- Infrignement.
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Sources of Assistance

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Large Potential for Small Units

Vendors Scurry to Tap Burgeoning Hong Kong Market

By a CW Staff Writer

HONG KONG — Mainframe vendors see the Hong Kong market as virtually untapped in comparison with its potential and are scurrying to increase the size of their bases.

The potential market for small IBM System/3s here is estimated at about 700 through the late '70s, according to Mike Smith, IBM's Hong Kong marketing manager.

The major barrier to computers in Hong Kong is the lack of education of local management, but this is being overcome with the introduction of low-cost, easy-to-install office computers, he said in an extensive article in the *Financial Review*.

The market also encompasses an immediate demand for about six medium-size mainframes in the range of the Univac 1106 or IBM 370/145, according to the article.

Rising labor wages is one reason the market is seen as burgeoning. No longer is the computer being viewed as an unnecessary luxury.

L.M. Stafford, general manager of the Southeast Asia region, IBM World Trade Asia Corp., is looking for significant growth in the manufacturing and processing industrics, such as tcxtilcs.

Described as the second largest market area in Southeast Asia after the Philippines and excluding Japan, the mainframe suppliers include IBM, ICL, NCR and relative newcomers Univac and Burroughs. Raytheon and Incoterm have installations with airlines here.

Honeywell, Fujitsu and Nippon Electric lack a sizable presence here, as do plug-compatible vendors and third-party mainframe lessors.

Reports concede IBM has over 50% of the market with 12 orders or installations of 370s and 27 orders or placements of System 3s, a System 7, several low-end 360s, a 1620 and two 1130s, the article said.

Smith estimated order sources for System 3s are fairly evenly split: 37% from Chinese locals, 26% from non-Chinese locals and 37% from subsidiaries of multinationals.

The total numbcr of computcrs installed or on ordcr in Hong Kong is set around 80 with a value at about $50 million, according to the report.

ICL, which has kept IBM out of the government market, has a total of 12 Series 1900s installed. The 2903 has been relatively slow to catch on, with only two orders.

International News

Univac, which recently opened its own branch office instead of selling through its agent, On-Line Hong Kong, is rapidly challenging ICL for its second-place share of the market with an order for nine 418s from Cable and Wireless.

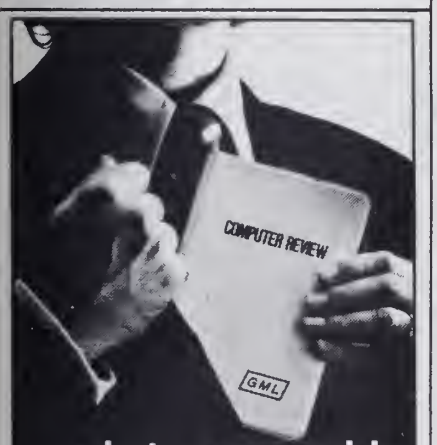
There are dual 1106s in the Chartered Bank, four 9000 serics computers and a 90/30 installcd in Hong Kong.

NCR has about 10 installations. CDC and Burroughs also have a few installations hcre.

The mini supplicrs are also here, with Data Gencral Corp. and Digital Equipment Corp. cach having several installations. Hcwlett-Packard and Computcr Automation are also in evidence.

Burroughs also is eyeing the small computer area. Doug Roots, manager of the Burroughs EDP Division here, forecasted a market of about 40 low-end machincs a year, with a maximum of six B6700 sales in the next two years. Roots is concentrating efforts on the B1700s and B2700s.

Ron Robbins of Univac believes there are around 200 potential users of the Univac 90/30 here, and the market should hold about six 1100 series size machines over the next two years.



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NCR to Realign Foreign Groups; New Unit to Give Market Support

DAYTON, Ohio – NCR plans a major realignment of its international operations reducing the number of regions from 10 to four. The new organization becomes effective Dec. 1.

International News

The new regions will be Europe, Middle East/Africa, Canada/Latin America and Far East/Australasia.

The European operations will continue to be managed by George Haynes, senior vice-president, Europe, who is based in Zurich. All others will be based in Dayton.

In addition, the company will establish a new International Marketing Services organization, also headquartered in Dayton, to provide marketing support, especially in the area of systems.

International Marketing Services will consolidate several previously separate functions, the firm said, and will include support of NCR overseas DP centers and field engineering activities.

The new unit will provide direct marketing support to all regions except Europe and Canada, where local marketing services will be maintained. Rex M. Fleet will head the operation as vice-president, International Marketing Services.

A.S. Gillan, currently vice-president, International Administration, becomes vice-president, Middle East/Africa.

Herbert M. Schene has named vice-president, Canada/Latin America. A successor to his current post of vice-president, Commercial Industrial Systems Marketing in the Domestic Division, will be announced later, the company said.

The head of the Far East/Australasia operation will also be named later.

Harry R. Wise, currently vice-president, International Marketing, will become vice-president, General Sales Agents. He will supervise activities in those countries where NCR is represented by general sales agencies.

Last year NCR's international revenues rose 23% to $895 million, almost half the company's total business.

The realignment is designed to further strengthen NCR's international operations and to provide better coordination of efforts in the more than 100 countries in which NCR operates, the company said.

Unidata 7000 Line Adds 3 Models

AMSTERDAM – After only 14 months of existence, Unidata has announced three computers in its 7000 Series – the 7.730, the 7.740 and the 7.750 – which fits in the range covered by the IBM 370/125, 135 and 145.

The European conglomerate, which includes Siemens, Philips and Compagnie Internationale pour L'Informatique (CII), announced its first machine, the 7.720 made by Philips, in January.

The 7.730 and 7.750 will come from Siemens, while CII will make the 7.740.

The models in the 7000 Series are said to be compatible with the existing products of the Unidata partners: the Iris range of CII, Siemens' 4004 and Philips' P1000. Versions of these series' operating systems are available for the 7000 Series, according to a report in *Computer Weekly*.

Deliveries of the 7.750 are expected to start in May 1975; July is the expected date for the 7.740 and September for the 7.730.

The 7000 Series incorporates virtual storage. The operating system is BS1000, a development of Siemens' DOS 4004. It allows simultaneous use of up to 14 programs and supports programs written in Fortran, Cobol, RPG, RPG-II, PL/I and Assembler, *Computer Weekly* said.

Although the 7.730 and 7.740 have data base and data communications facilities, they appear to be primarily batch machines, the article said. The 7.750 is said to have full interactive capability while running batch programs in background.

Philips Introduces 'Low-End' 300 System

EINDHOVEN, The Netherlands – Aiming at the low end of the office computer market, Unidata partner Philips has introduced the Unidata 300, which may be used as a stand-alone computer or an intelligent terminal within a network.

The 300's CPU is connected through a data bus to all I/O devices, has an automatic diagnostic test system, uses a minicassette and can contain two independent paper feeders, which allows use of ledger cards as well as continuous forms. The matrix printer operates at 30 char./sec.

The core memory has an access time of 600 nsec and programming is in the Phocal language.

Philips, which claims 18% of the European market with its 20,000 P350s, said the 300 is designed to fill the need for a machine at the low end of the market.

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The readers are bidirectional and will accept tape of five to eight levels, including advance feed tapes, with infrared transmissivities to 57%, the firm said.

Models in the series include the RR7300 reader priced at $645, RRS7300G reader/spooler with 5-1/4 in. reel at $995, RRS7300D reader/spooler with 7-1/2 in. reel and bidirectional 1,200 char./sec rewind speed at $1,295, and RRS7150 reader/spooler with 7-1/2 in. reel at $1,145.

Delivery is 60 to 90 days from the firm at 1733 Alton St., 92705.

Terminal Controller Supports Bell, WU Units

LITTLE SILVER, N.J. – Nu-Data Corp. has brought out a data terminal controller for the OEM user.

Called the Model 130, the system is designed to interface between one or more terminals and the line, allowing for operator control through switches on the controller.

The controller comes with firmware for Bell 83, 85, 8A or, Western Union 135 protocols, according to a NuData spokesman.

Both send/receive and receive-only versions of the terminal are available. Each version provides selectable start-stop operating speeds between 31.5- and 1,200 bit/sec.

The controller supplies parity checking and will process any code of five to eight bits, the spokesman said.

The Model 130 controller costs $950 with delivery in four to six weeks from the firm at 32 Fairview Ave., 07739.

Correction

The channel adapter from Austron Corp. sells for $8,500 [CW, Sept. 11].

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2. DATE OF FILING: 9-24-74
3. FREQUENCY OF ISSUE: Weekly (except single issue for last week in Dec. & first week in Jan.)
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5. LOCATION OF THE HEADQUARTERS OR GENERAL BUSINESS OFFICES OF THE PUBLISHERS (Not printers): 797 Washington St., Newtonville, Ma. 02160
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Datapoint Doubles '74 Operating Income

SAN ANTONIO, Texas – Datapoint Corp. scored record earnings in the year ended July 31 and nearly doubled its income before tax credits.

Earnings rose to $3.4 million or $1.68 a share from almost $2 million or $1.08 a share in 1973. Income before tax credits jumped 99% to $2.4 million from $1.2 million last year.

Revenues rose 83% to $34.1 million from $18.6 million last year, while the purchase value of equipment shipped for sale or lease rose 121% to $65.4 million from $29.6 million.

In the last quarter, revenues rose to $9.1 million from $6.4 million in the same period last year, while earnings, including a $226,000 tax credit, climbed to $939,000 or 45 cents a share compared with $820,000 or 44 cents a share in the year-ago period when there was a $245,000 tax credit.

Datapoint's president, H.E. O'Kelley, said he expects the company's fully diluted earnings per share before tax credits to increase about 30% to 40% next year unless economic conditions throughout the world become drastically worse than most current forecasts.

Expenses Deplete Pertec Earnings

EL SEGUNDO, Calif. – Costs associated with the discontinuance of its line printer operation in addition to marketing and development expenses of new products caused Pertec Corp. to register lower earnings for the year ended June 28.

Revenues, however, rose to $32.9 million from $27.4 million in 1973.

The year's earnings totaled nearly $1.3 million or 41 cents a share compared with $1.6 million or 54 cents a share last year. Income from continuing operations was $56,000 less than last year's $2.1 million.

The loss from the discontinued line printer operation totaled $1 million compared with a $477,000 loss in the 1973 period.

"With these costs behind us and a year-end backlog at the highest point in the company's history, we look forward to a very profitable 1975," Ryal R. Poppa, Pertec's president said.

'Reduced Revenue, Lessened Loss' Formula Works for Boothe Computer

SAN FRANCISCO – Reduced revenues, reduced losses seemed to be the formula at work for Boothe Computer Corp. during the second quarter and six months ended June 30.

Revenues in the quarter fell to $9.9 million from $13.3 million in the year-ago period while Boothe cut its loss to $557,000 or 25 cents a share compared with $820,000 or 38 cents a share.

The story was the same for the six-months period. Revenues declined to $21.5 million from $24.6 million and losses were $1.4 million or 66 cents a share compared with $1.9 million or 89 cents a share in the 1973 period.

Losses were largely attributable to continued high debt cost and operating losses of Boothe's subsidiaries, Courier Terminal Systems, Inc. and Boothe Airside Systems, Inc.

The company expects Boothe Airside to be profitable for the second half of the year and Courier will be close to breaking even on a monthly basis by the end of 1974 and report profits for 1975.

Operating results for computer leasing activities for the first half are approximately as forecast, the company said.

Boothe completed an offer to exchange cash and preferred stock for outstanding 5-3/4% convertible subordinated debentures due 1988, which materially strengthened its financial position, according to the firm. Of the debentures outstanding, 79% or $14.2 million in principal of the debentures' amount was exchanged.

CDC Anticipates 3d-Quarter Loss

ST. PAUL, Minn. – Pending cancellation of a cooperative development project with the Union Bank of Switzerland will cause Control Data Corp.'s (CDC) computer operations to incur a loss for the third quarter, CDC chairman William C. Norris said.

CDC has incurred about $26 million of costs in the project but final costs are not now determinable because "settlement terms and potential recovery could significantly affect the final result," he said.

CDC wishes to continue work on the integrated DP system, Norris said, adding "since the project is a cooperative development effort under which Union Bank is responsible for the development of applications-software programs for the system, the bank's continued efforts are vital to success of the project."

CDC offered to participate in the software development but the bank declined the offer, he noted.

CDC is establishing a loss reserve as a result of which its computer operations will report a loss for the September quarter.

Tektronix Posts 19% Earnings Gain

BEAVERTON, Ore. – Tektronix, Inc., maker of CRT displays and measurement equipment, posted a 19% rise in earnings on a 32% gain in revenues for the year ended Aug. 24.

Earnings reached $21.9 million or $2.54 a share in the 53-week period compared with $18.4 million or $2.13 a share in the 52-week 1973 period.

Revenues climbed to $288.4 million from 217.9 million last year.

For the fourth quarter, earnings rose 11.5% to $5.8 million or 66 cents a share from $5.2 million or 60 cents a share last year.

Revenues totaled $72.8 million compared with $55.8 million in the 1973 period.

Orders received during the period stood at $82.1 million compared with $62.3 million in the year-ago period, a 32% rise.

ACT Sets Record Period

NEW YORK – Advanced Computer Techniques Corp. (ACT) showed record quarterly earnings during the first quarter ended June 30.

Earnings rose 140% to $65,000 or 6 cents a share compared with $28,300 in the year-ago period.

Revenues rose a record 120% almost $2 million from $901,000 in the same period last year.

The company's prospects for the rest of the year are very favorable, said President Charles P. Lecht.

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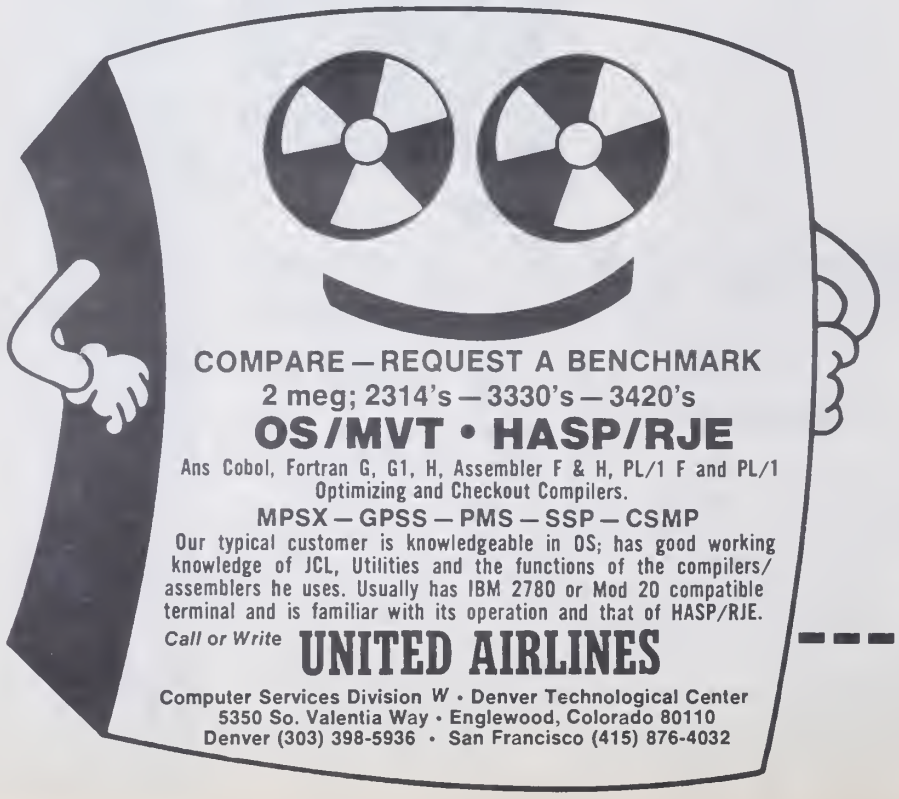

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Earnings Reports

WYLY
Three Months Ended June 30

	1974	a1973
bRevenue	$26,489,000	$26,089,000
cSpec Chg	.....	(170,000)
Loss	295,000	366,000
6 Mo Shr	.11	.09
bRevenue	50,475,000	51,850,000
Earnings	910,000	771,000

a-Results for the second quarter have been restated to reflect a year-end adjustment. b-Excludes unconsolidated insurance underwriting revenues. c-Loss of first quarter tax-loss carryforward credit.

STORAGE TECHNOLOGY
Three Months Ended June 28

	a1974	1973
Shr Ernd	$.36	$.42
Revenue	18,095,000	11,706,000
Tax Cred	.....	520,000
Earnings	1,234,000	1,431,000
6 Mo Shr	.69	.91
Revenue	34,329,000	23,040,000
Tax Cred	.....	1,165,000
Earnings	2,364,000	3,120,000

a-Reflects results of Disk Systems Corp., acquired by a wholly owned subsidiary of the company on June 7, 1974.

NUCLEAR DATA
Three Months Ended May 31

	1974	1973
Shr Ernd	$.32	$.26
Revenue	5,049,364	4,685,015
Tax Cred	88,000	40,000
Earnings	271,533	218,860

ON-LINE SYSTEMS
Three Months Ended July 31

	1974	1973
Shr Ernd	$.51	$.33
Revenue	2,990,158	1,897,031
Earnings	427,210	262,752

TECHNICAL TAPE
Three Months Ended June 30

	1974	1973
Shr Ernd	$.19	$.07
Revenue	12,316,000	10,579,000
Spec Cred	a253,000	a82,000
Earnings	629,000	238,000
6 Mo Shr	.30	.16
Revenue	24,724,000	20,999,000
Spec Cred	a445,000	a232,000
Earnings	1,008,000	550,000

a-In 1974, tax credit; in 1973, Includes loss on prepayment of note.

TECHNITROL
Three Months Ended June 30

	1974	1973
Shr Ernd	$.17	$.10
Revenue	4,410,221	2,586,291
Earnings	233,619	143,969
6 Mo Shr	.30	.15
Revenue	8,472,018	4,968,779
Earnings	402,072	214,406

TELEX
Three Months Ended June 30

	1974	1973
Shr Ernd	a$.02	.....
Revenue	29,495,000	19,763,000
Earnings	165,000	(4,007,000)

a-On a fully diluted basis.

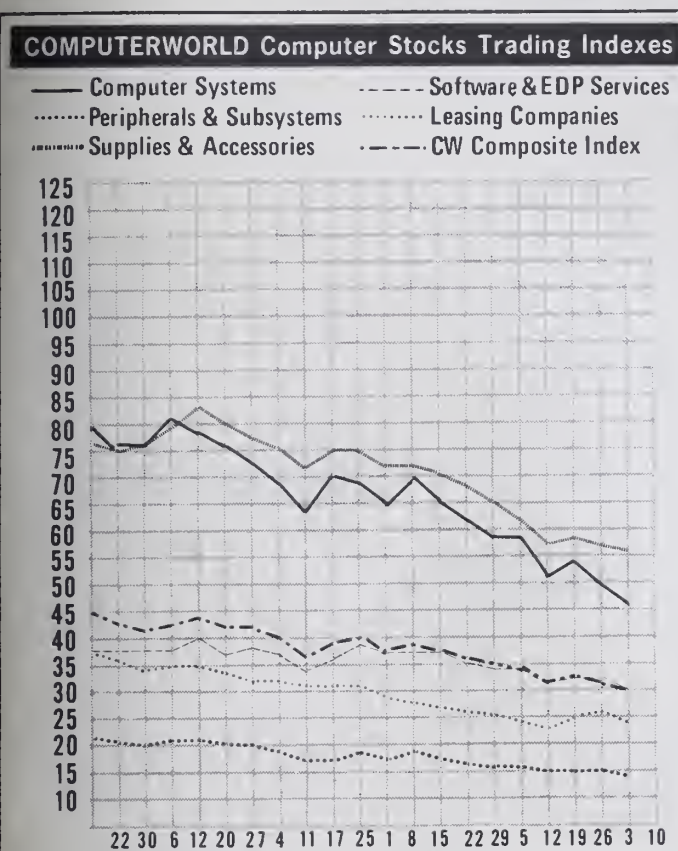
COMSERV
Six Months Ended June 30

	1974	1973
Shr Ernd	$.04	$.02
Revenue	760,642	693,352
Earnings	29,271	14,635

DATATAB
Three Months Ended June 30

	1974	1973
Shr Ernd	$.04	$.06
Revenue	1,254,954	1,355,106
Earnings	30,881	49,043
6 Mo Shr	.11	.08
Revenue	2,507,394	2,537,892
Earnings	82,575	61,831

COMPUTERWORLD Computer Stocks Trading Indexes



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Computerworld Stock Trading Summary

TRADE*QUOTES

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

E X C H		1974 RANGE (1)	CLOSE OCT 3 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	63-217	63	-7 7/8	-11.1
O	COMPUTER AUTOMATION	4- 14	3 7/8	- 5/8	-13.8
N	CONTROL DATA CORP	13- 38	12 5/8	-3 1/8	-19.8
N	DATA GENERAL CORP	13- 38	12 7/8	-3 1/2	-21.3
O	DATAPOINT CORP	7- 15	7 1/2	- 1/2	-6.2
O	DIGITAL COMP CONTROL	2- 5	1 7/8	- 3/8	-16.6
N	DIGITAL EQUIPMENT	63-121	62 3/4	-3 3/8	-5.1
N	ELECTRONIC ASSOC.	2- 3	1 3/4	- 1/4	-12.5
A	ELECTRONIC ENGINEER.	5- 11	5 1/2	- 1/4	-4.3
N	FOXBORO	19- 48	19 1/4	-2 1/2	-11.4
O	GENERAL AUTOMATION	14- 40	14 1/4	-3 1/2	-19.7
O	GRI COMPUTER CORP	1- 2	1/2	0	0.0
N	HEWLETT-PACKARD CO	58- 90	57 5/8	-4 1/2	-7.2
N	HONEYWELL INC	25- 86	24 1/2	-5 1/8	-17.2
N	IBM	152-251	157 3/4	-6 1/4	-3.8
O	INTERDATA INC	8- 22	13 1/2	0	0.0
O	MICRODATA CORP	2- 5	1 7/8	- 1/8	-6.2
N	NCR	19- 40	18 5/8	-1 3/8	-6.8
N	RAYTHEON CO	21- 39	21	-2	-8.6
N	SINGER CO	14- 40	13 5/8	- 1/4	-1.8
N	SPERRY RAND	24- 44	24 1/2	-2 1/4	-8.4
A	SYSTEMS ENG. LABS	1- 3	1 1/4	0	0.0
N	TEXAS INSTRUMENTS	60-115	61 3/8	+ 5/8	+1.0
O	ULTIMACC SYSTEMS INC	1- 2	7/8	0	0.0
N	VARIAN ASSOCIATES	6- 13	6 1/8	- 1/2	-7.5
N	WANG LABS.	7- 20	7 7/8	- 7/8	-10.0
N	XEROX CORP	63-127	62 3/4	-3 3/4	-5.6
	LEASING COMPANIES				
O	BRESNAHAN CORP.	2- 2	2 1/8	0	0.0
O	COMDISCO INC	1- 7	1 1/2	0	0.0
A	COMMERCE GROUP CORP	3- 6	3	+ 1/8	+4.3
O	COMPUTER EXCHANGE	1- 1	1/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 4	3/4	0	0.0
O	COMP. INSTALLATIONS	1- 1	1/4	0	0.0
M	DATRONIC RENTAL	1- 1	7/8	0	0.0
A	DCL INC	0- 1	3/8	-	-14.3
N	DPF INC	2- 5	2 3/8	- 1/8	-5.0
O	EDP RESOURCES	2- 3	3 1/4	0	0.0
A	GRANITE MGT	1- 3	5/8	- 1/4	-31.1
A	GREYHOUND COMPUTER	2- 6	2 1/4	0	0.0
A	ITEL	3- 6	3	0	0.0
N	LEASCO CORP	5- 12	6 7/8	-1 3/8	-16.6
O	LEASPAC CORP	0- 2	1/2	- 1/8	-20.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	1- 5	2	+ 3/8	+23.0
A	PIONEER TEX CORP	2- 10	2 5/8	+ 1/8	+5.0
A	ROCKWOOD COMPUTER	1- 1	1/2	- 1/8	-27.3
N	U.S. LEASING	5- 24	6 3/8	- 7/8	-12.0

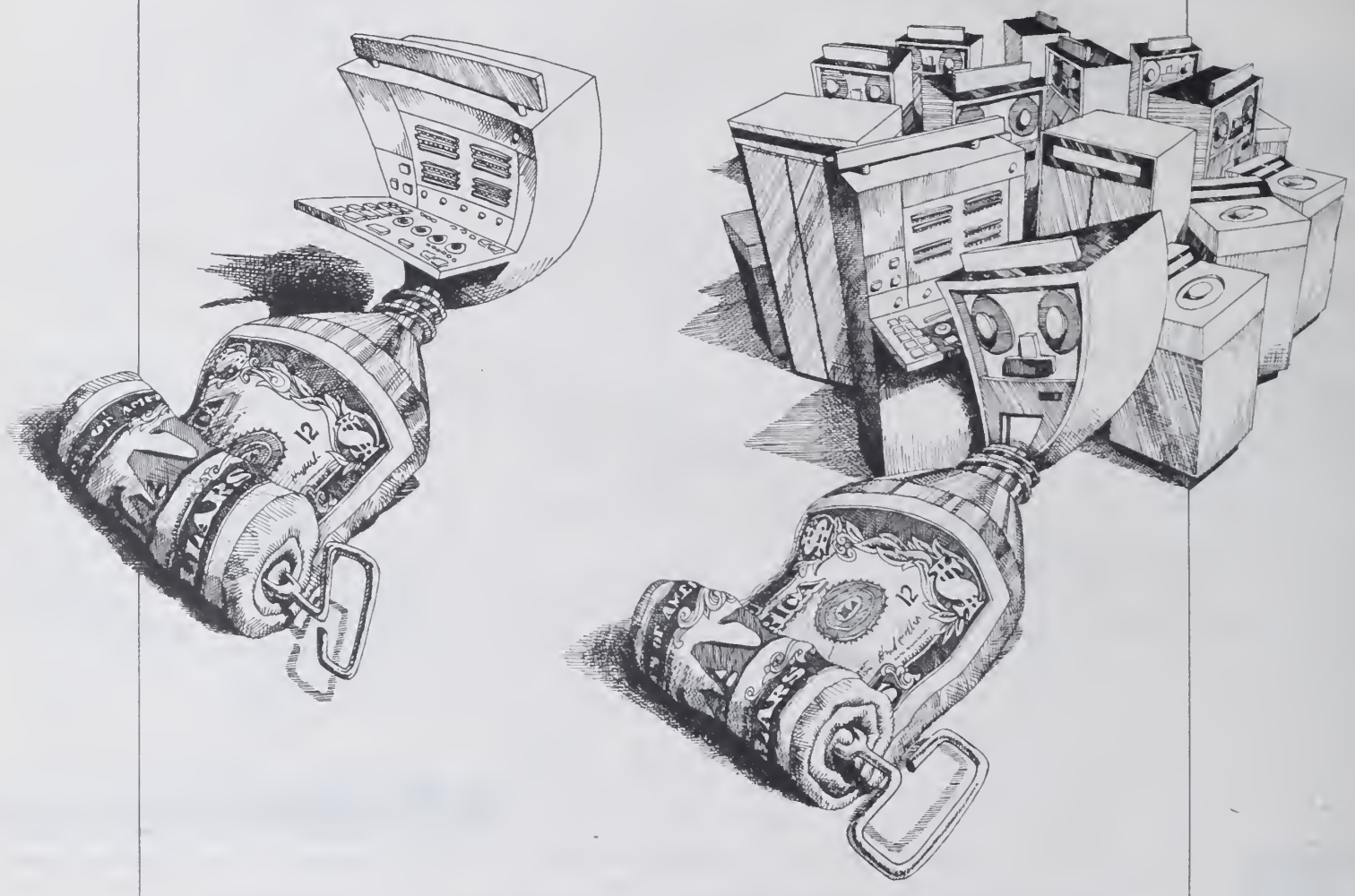
E X C H		1974 RANGE (1)	CLOSE OCT 3 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	5/8	- 3/8	-37.5
A	APPLIED DATA RES.	2- 3	1 1/2	0	0.0
O	APPLIED LOGIC	1- 1	1/8	0	0.0
N	AUTOMATIC DATA PROC	21- 57	22 3/4	-2	-8.0
O	BRANDON APPLIED SYST	1- 1	1/8	- 1/8	-50.0
O	CENTRAL DATA SYSTEMS	4- 6	3	0	0.0
O	COMPUTER DIMENSIONS	2- 3	1 1/2	0	0.0
O	COMPUTER HORIZONS	1- 5	1	0	0.0
O	COMPUTER NETWORK	1- 2	1	- 1/8	-11.1
N	COMPUTER SCIENCES	2- 4	2 1/4	0	0.0
O	COMPUTER TASK GROUP	1- 1	3/4	0	0.0
O	COMPUTER TECHNOLOGY	1- 1	1/2	0	0.0
O	COMPUTER USAGE	2- 4	2 1/2	- 1/8	-4.7
O	COMRESS	1- 1	1/4	0	0.0
O	COMSHARE	2- 4	1 5/8	- 1/8	-7.1
N	COROUPA CORP	2- 4	1 5/8	0	0.0
O	DATATAB	1- 3	1 1/4	+ 1/8	+11.1
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	12- 25	12 1/2	- 1/8	-0.9
O	INFONATIONAL INC	1- 2	1/2	0	0.0
O	I.O.A. DATA CORP	1- 1	1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 1	3/4	0	0.0
O	KEANE ASSOCIATES	2- 4	1 3/4	0	0.0
O	KEYDATA CORP	1- 6	1 1/4	- 1/4	-16.6
O	LOGICON	2- 5	2 1/8	- 1/4	-10.5
A	MANAGEMENT DATA	1- 2	1	0	0.0
O	NATIONAL CSS INC	9- 37	10	-1 1/2	-13.0
O	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0
A	ON LINE SYSTEMS INC	18- 30	19 1/8	- 7/8	-4.3
N	PLANNING RESEARCH	2- 3	2 1/8	0	0.0
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	PAPLDATA INC	1- 5	1	- 1/4	-20.0
O	SCIENTIFIC COMPUTERS	1- 1	5/8	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1/4	- 1/2	-66.6
O	TCC INC	1- 1	1/4	0	0.0
O	TYMSHARE INC	6- 12	5 5/8	-1 1/4	-18.1
O	UNITED DATA CENTER	2- 4	1 3/4	- 1/4	-12.5
A	UPS SYSTEMS	2- 4	1 3/4	- 1/8	-6.6
N	WYLY CORP	2- 5	1 7/8	- 1/2	-21.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	4- 11	3 7/8	- 5/8	-13.8
O	ADVANCED MEMORY SYS	1- 7	1 3/8	0	0.0
N	AMPEX CORP	3- 5	3	- 1/8	-4.0
O	ANDERSON JACOBSON	2- 4	2	- 1/4	-11.1
O	BEEHIVE MEDICAL ELEC	2- 7	2 3/4	0	0.0
A	BOLT,BERANEK & NEW	5- 9	4 3/4	- 5/8	-11.6
N	BUNKER-RAMO	4- 8	4 5/8	- 1/8	-2.6
A	CALCOMP	5- 11	6	+ 1/4	+4.3
O	CAMBRIDGE MEMORIES	4- 16	4 3/4	- 3/8	-7.3
O	CENTRONICS DATA COMP	7- 23	8 1/2	+ 3/4	+9.6
O	COGEX CORP	8- 15	10	- 1/4	-2.4
O	COGNITRONICS	1- 2	1/2	0	0.0

F X C H		1974 RANGE (1)	CLOSE OCT 3 1974	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER COMMUN.	1- 2	3/8	0	0.0
A	COMPUTER EQUIPMENT	1- 2	1 1/8	- 1/8	-10.0
O	COMPUTER MACHINERY	1- 5	1 1/4	-1 1/8	-47.3
O	COMPUTER TRANSCEIVER	1- 2	7/8	+ 1/8	+16.6
N	CONRAC CORP	10- 22	11 1/4	0	0.0
O	DATA ACCESS SYSTEMS	2- 3	2 1/2	0	0.0
O	DATA 100	5- 13	5 1/4	-1 1/8	-17.6
A	DATA PRODUCTS CORP	3- 4	2 3/4	- 1/8	-4.3
O	DATA RECOGNITION	1- 1	1/4	0	0.0
O	DATA TECHNOLOGY	2- 4	1 3/4	- 5/8	-26.3
O	DECISION DATA COMPUT	3- 13	4 5/8	+ 1/8	+2.7
O	DELTA DATA SYSTEMS	1- 2	5/8	- 1/8	-16.6
O	DIVAN CONTROLS	1- 2	1/2	- 1/8	-20.0
N	ELECTRONIC M & M	2- 4	1 5/8	0	0.0
O	FABRI-TEK	1- 3	7/8	- 1/4	-22.2
O	GENERAL COMPUTER SYS	1- 4	1 1/4	0	0.0
N	GENERAL ELECTRIC	30- 65	33 3/8	+ 3/8	+1.1
N	HAZELTINE CORP	3- 7	3	0	0.0
O	INFOREX INC	2- 5	2 3/8	- 1/2	-17.3
O	INFORMATION DISPLAYS	1- 1	1/8	0	0.0
O	INFORMATION INTL INC	7- 14	6 3/4	- 1/4	-3.5
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/8	0	0.0
N	MEMOREX	2- 5	2 1/4	- 1/8	-5.2
A	MILGO ELECTRONICS	6- 18	6 1/4	+ 1/8	+2.0
N	MOHAWK DATA SCI	1- 4	1 3/4	+ 1/4	+16.6
O	ODEC COMPUTER SYST.	1- 3	1	0	0.0
O	OPTICAL SCANNING	3- 6	3 1/2	0	0.0
O	PERTEC CORP	2- 6	2 1/2	- 1/8	-4.7
A	POTTER INSTRUMENT	1- 5	1 5/8	0	0.0
O	PRECISION INST.	1- 3	3/4	0	0.0
O	QUANTOR CORP	2- 8	2	0	0.0
O	RECOGNITION EQUIP	2- 5	1 1/2	- 1/2	-25.0
N	SANDERS ASSOCIATES	2- 8	2 1/2	0	0.0
O	SCAN DATA	1- 2	1	- 1/8	-11.1
O	STORAGE TECHNOLOGY	7- 15	7	- 7/8	-11.1
O	SYCOR INC	4- 13	4 1/2	-1 1/4	-21.7
O	TALLY CORP.	2- 4	1 3/4	- 3/8	-17.6
O	TEC INC	2- 7	2	+ 1/4	+14.2
N	TEKTRONIX INC	22- 48	22 3/8	-1 7/8	-7.7
N	TELEX	3- 4	4	+ 3/4	+23.0
O	WANGCO INC	5- 13	4 3/4	- 1/4	-5.0
O	WILTEK INC	2- 8	1 3/4	- 1/4	-12.5
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 6	4 1/2	+ 1/4	+5.8
A	BARRY WRIGHT	4- 7	4	- 1/8	-3.0
O	CYBERNATICS INC	1- 2	5/8	0	0.0
A	DATA DOCUMENTS	23- 54	27 1/4	-2 1/4	-7.6
O	DUPLEX PRODUCTS INC	6- 17	11 1/4	-1	-8.1
N	ENNIS BUS. FORMS	4- 7	5	+ 3/8	+8.1
O	GRAHAM MAGNETICS	6- 11	6 1/4	- 1/4	-3.8
O	GRAPHIC CONTROLS	6- 11	6	- 1/4	-4.0
N	3M COMPANY	48- 79	47 1/2	-4 1/4	-8.2
N	MOORE CORP LTD	33- 57	33 1/4	-4 1/2	-11.9
N	NASHUA CORP	24- 45	24 3/4	- 1/2	-1.9
O	REYNOLDS & REYNOLD	8- 35	10	- 1/2	-4.7
O	STANDARD REGISTER	10- 16	11	0	0.0
O	TAB PRODUCTS CO	5- 11	5	0	0.0
N	UARCO	13- 23	14	-1	-6.6
A	WABASH MAGNETICS	3- 7	3	- 1/4	-7.6
N	WALLACE BUS FORMS	14- 24	16 3/4	- 1/8	-0.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

$51,238
per month
rental

$48,406
per month
lease



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